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Oskarshamn site investigation

Hydraulic injection tests in borehole KLX04, 2004

Sub-area Laxemar

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December 2004

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

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.

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Abstract

Hydraulic injection tests have been performed in borehole KLX04 at the Laxemar area, Oskarshamn. The tests are part of the general program for site investigations and specifically for the Laxemar sub-area. The hydraulic testing programme has the aim to characterise the rock with respect to its hydraulic properties of the fractured zones and rock mass between them. Data is subsequently delivered for the site descriptive model.

This report describes the results and primary data evaluation of the hydraulic injection tests in borehole KLX04 performed between 17th of August and 8th of September 2004.

The objective of the hydrotests was to describe the rock around the borehole with respect of hydraulic parameters, mainly transmissivity (T) and hydraulic conductivity (K) at different measurement scales of 100 m, 20 m and 5 m sections. Transient evaluation during flow and recovery period provided additional information such as flow regimes, hydraulic boundaries and cross-over flows. Constant pressure injection tests were conducted between 105.11–986.11 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 KLX04 i delområde Simpevarp, Oskarshamn. Testerna är en del av SKB:s platsundersökningar. Hydraultestprogrammet där injektionstesterna ingår har som mål att karakterisera berget med avseende på dess hydrauliska egenskaper av sprickzoner och mellanliggande bergmassa. Data från testerna används vid den platsbeskrivande modelleringen av området.

Denna rapport redovisar resultaten och utvärderingar av primärdata från de hydrauliska injektionstesterna i borrhål KLX04. Testerna utfördes mellan den 17 augusti till den 8 september 2004.

Syftet med hydrotesterna var framförallt att beskriva bergets hydrauliska egenskaper runt borrhålet med avseende på hydrauliska parametrar, i huvudsak transmissivitet (T), hydraulisk konduktivitet (K) vid olika mätskalor av 100 m, 20 m och 5 m sektioner. Transient utvärdering under injektions- och återhämtningsfasen gav ytterligare information avseende flödesgeometri, hydrauliska gränser och sprickläckage. Injektionstester utfördes mellan 105.11–986.11 m borrhålslängd. Resultaten av test utvärderingen presenteras som transmissivitet, hydraulisk konduktivitet och grundvattennivå uttryckt i ekvivalent nivå sötvattenpelare (fresh-water head).



Borehole KLX04 – Summary of results.

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Appendix 5 SICADA datatables

1 Introduction

A general program for site investigations presenting survey methods has been prepared /SKB, 2001a/, as well as a site-specific program for the investigations in the Simpevarp area /SKB, 2001b/. 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 accordingly in borehole KLX04 during 17th August to 8th September 2004 following the methodology described in SKB MD 323.001e and in the activity plan AP PS 400-04-75 (SKB internal controlling documents). Data and results were delivered to the SKB site characterization database SICADA. The field note number in SICADA is 466.

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 KLX04. The data is subsequently delivered for the site descriptive modelling. The commission was conducted by Golder Associates AB and Golder Associates GmbH.

Borehole KLX04 is situated in the Laxemar area approximately 1 km west of the nuclear power plant of Simpevarp, Figure 1-1. The borehole was drilled from February 2004 to June 2004 at 993.49 m depth with an inner diameter of 76 mm and an inclination of -84.68°. The upper 12.24 m is cased with large diameter telescopic casing ranging from diameter (outer diameter) 208–324 mm.



Figure 1-1. The investigation area Laxemar, Oskarshamn with location of borehole KLX04.

2 Objective

The objective of the hydrotests in borehole KLX04 is to describe the rock around the borehole with respect to hydraulic parameters, mainly transmissivity (T) and hydraulic conductivity (K). This is done at different measurement scales of 100 m, 20 m and 5 m sections. Among these parameters transient evaluation during the flow and recovery period provides additional information such as flow regimes, hydraulic boundaries and cross-over flows.

A further subactivity was performed according to the activity plan with chemistry investigations including pump tests and taking water samples.

3 Scope of work

The scope of work consisted of preparation of the PSS2 tool which included cleaning of the down-hole tools, calibration and functional checks, injection tests of 100 m, 20 m and 5 m test sections, analysis 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 test programme was performed.

No of Injection tests	Interval	Positions	Time/test	Total test time
	100		105 min	10.0 hrs
9	100 m	105.11–986.11 m	125 min	18.8 nrs
39	20 m	105.21–983.05 m	90 min	58.5 hrs
69	5 m	300.41–685.78 m	90 min	103.5 hrs
			Total:	180.8 hrs

Table 3-1. Performed test programme at borehole KLX04.

3.1 Boreholes

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

Title	Value				
Borehole length (m)	993.490				
Drilling Period(s)	From date	To date	Secup (m)	Seclow (m)	Drilling type
	2004-02-11	2004-02-18	0.000	100.400	Percussion drilling
	2004-03-13	2004-06-28	0.000	993.490	Core drilling
Starting point coordinate	Length (m)	Northing (m)	Easting (m)	Elevation (masl)	Coord Sys
(centerpoint of TOC)	0.000	6367077.188	1548171.937	24.089	RT90-RHB70
Angles	Length (m)	Bearing	Inclination (- =	down)	
	0.000	0.109	-84.683		

Table 3-2. Information about KLX04 (from SICADA 2004-08-11 09:43:36).

Borehole diameter	Secup (m)	Seclow (m)	Hole diam (m)	
	0.000	12.000	0.347	
	12.000	12.240	0.254	
	12.240	100.300	0.196	
	100.350	101.470	0.086	
	101.470	993.490	0.076	
Core diameter	Secup (m)	Seclow (m)	Core diam (m)	
	100.350	101.470	0.050	
	101.470	993.490	0.050	
Casing diameter	Secup (m)	Seclow (m)	Case in (m)	Case out(m)
	0.000	12.240	0.200	0.208
	0.000	11.900	0.310	0.324
Grove milling	Length (m)	Trace detecta	ble	
	110.000	YES		
	150.000	YES		
	200.000	YES		
	250.000	YES		
	300.000	YES		
	349.000	YES		
	400.000	YES		
	450.000	YES		
	500.000	YES		
	550.000	YES		
	600.000	YES		
	650.000	YES		
	700.000	YES		
	750.000	YES		
	800.000	YES		
	849.000	YES		
	899.000	YES		
	950.000	YES		

During this testing campaign, the markers at 800.0 m and 849.0 m could not be detected with the positioner.

3.2 Tests

Injection tests were conducted according to the Activity Plan AP PS 400-04-75 and the method description for hydraulic injection tests, SKB MD 323.001 (SKB internal documents). Tests were done in 100 m test sections between 105.11–986.11 m below ToC, in 20 m test sections between 105.21–983.05 m below ToC and in 5 m test sections between 300.41–685.78 m below ToC. The initial criteria for performing injection tests in 20 m and 5 m test sections was a measurable flow of Q > 0.001 L/min in the previous measured tests covering the smaller sections (see Figure 3-1). The measurements were performed with SKB's custom made equipment for hydraulic testing called PSS2.



 * eventually tests performed after specific discussion with SKB

Figure 3-1. Flow chart for test sections.

Bh ID	Test section (m)	Test type¹	Test no	Test start Date, time	Test stop Date, time
KLX04	105.11–205.11	3	1	2004-08-20	2004-08-20
				09:59:51	12:44:58
KLX04	205.34–305.34	3	1	2004-08-20	2004-08-20
				14:51:30	16:01:27
KLX04	205.34–305.34	3	2	2004-08-20	2004-08-20
				16:11:09	17:40:53
KLX04	305.41-405.41	3	1	2004-08-21	2004-08-21
				08:14:28	10:33:27
KLX04	405.49–505.49	3	1	2004-08-21	2004-08-21
				11:48:49	13:37:39
KLX04	505.55-605.55	3	1	2004-08-21	2004-08-21
				14:57:32	16:40:32
KLX04	605.69–705.69	3	1	2004-08-22	2004-08-22
				08:12:10	10:01:06
KLX04	705.81–805.81	4	1	2004-08-22	2004-08-22
				11:37:06	13:58:33
KLX04	805.98–905.98	3	1	2004-08-22	2004-08-22
				15:17:27	17:26:26
KLX04	886.11–986.11	3	1	2004-08-23	2004-08-23
				08:00:11	09:52:20

Table 3-3. Tests performed.

Bh ID	Test section (m)	Test type¹	Test no	Test start Date, time	Test stop Date, time
KLX04	105.21–125.21	3	1	2004-08-24	2004-08-24
				07:29:54	08:57:26
KLX04	125.25–145.25	3	1	2004-08-24	2004-08-24
				09:54:13	11:20:34
KLX04	145.30–165.30	3	1	2004-08-24	2004-08-24
				21:02:24	22:45:41
KLX04	165.30–185.30	3	1	2004-08-24	2004-08-25
				23:44:26	01:18:07
KLX04	185.32–205.32	3	1	2004-08-25	2004-08-25
				06:35:35	08:06:55
KLX04	205.34–225.34	3	1	2004-08-25	2004-08-25
				08:49:05	10:26:31
KLX04	225.35–245.35	3	1	2004-08-25	2004-08-25
				11:23:52	14:01:42
KLX04	225.35–245.35	3	2	2004-08-30	2004-08-30
				05:53:46	07:04:32
KLX04	245.38-265.38	3	1	2004-08-30	2004-08-30
		-	-	07:53:46	09:17:27
KI X04	265.38-285.38	3	1	2004-08-30	2004-08-30
	200.00 200.00	U	·	09:53:02	10:59:47
KI X04	285 40-305 40	3	1	2004-08-25	2004-08-25
KEX04	200.40 000.40	0	•	21.17.16	22:08:59
KI X04	285 40-305 40	з	2	2004-08-25	2004-08-26
KLX04	203.40-303.40	5	2	2004-00-20	01.14.47
KI X04	305 /1_325 /1	з	1	2004-08-26	2004-08-26
KLX04	505.41-525.41	5	1	02.27.50	04.04.24
	225 11 215 11	2	1	2004 09 26	2004.09.26
KLAU4	323.44-345.44	3	I	2004-06-20	2004-06-20
	24E 44 26E 44	2	4	00.31.09	07.55.49
KLX04	343.44–303.44	3	I	2004-08-20	2004-08-20
KI VO4		2	4	08:37:05	09:59:32
KLX04	305.44–385.44	3	1	2004-08-26	2004-08-26
				10:38:16	12:12:14
KLX04	385.47–405.47	3	1	2004-08-26	2004-08-26
		_		14:00:53	15:53:23
KLX04	405.49–425.49	3	1	2004-08-26	2004-08-26
				16:37:08	18:31:33
KLX04	425.51–445.51	3	1	2004-08-26	2004-08-26
				19:32:01	21:03:07
KLX04	445.50–465.50	3	1	2004-08-26	2004-08-26
				22:11:21	23:40:40
KLX04	445.50-465.50	3	2	2004-08-30	2004-08-30
				16:11:21	17:57:14
KLX04	465.52–485.52	3	1	2004-08-27	2004-08-27
				00:32:05	02:22:26
KLX04	485.52–505.52	4	1	2004-08-27	2004-08-27
				06:37:58	08:29:27

Bh ID	Test section (m)	Test type¹	Test no	Test start Date, time	Test stop Date, time
KLX04	505.55-525.55	3	1	2004-08-27	2004-08-27
				09:11:55	10:43:29
KLX04	525.58–545.58	4	1	2004-08-27	2004-08-27
				11:14:58	14:14:03
KLX04	545.62–565.62	3	1	2004-08-27	2004-08-27
				14:59:36	16:30:55
KLX04	545.62-565.62	3	2	2004-08-27	2004-08-27
				19:34:21	20:42:50
KLX04	565.64–585.64	3	1	2004-08-27	2004-08-27
				21:41:33	23:14:34
KLX04	585.65–605.65	3	1	2004-08-28	2004-08-28
				00:07:31	01:30:52
KLX04	605.69–625.69	3	1	2004-08-28	2004-08-28
				02:17:09	03:47:15
KLX04	625.71–645.71	3	1	2004-08-28	2004-08-28
				06:37:42	07:58:43
KLX04	645.73–665.73	3	1	2004-08-28	2004-08-28
				08:45:57	10:12:44
KLX04	665.76–685.76	3	1	2004-08-28	2004-08-28
				10:47:42	12:40:11
KLX04	685.79–705.79	4	1	2004-08-28	2004-08-28
				13:37:24	16:05:04
KLX04	805.98-825.98	Skipped	1	2004-08-28	2004-08-28
				17:59:56	19:02:41
KLX04	826.02-846.02	Skipped	1	2004-08-28	2004-08-28
				20:06:57	22:06:42
KLX04	846.05-866.05	Skipped	1	2004-08-28	2004-08-29
				22:55:23	00:01:00
KLX04	866.08-886.08	3	1	2004-08-29	2004-08-29
				00:49:05	02:21:38
KLX04	886.11–906.11	3	1	2004-08-29	2004-08-29
				03:06:01	04:52:19
KLX04	886.11–906.11	3	2	2004-08-31	2004-08-31
				01:49:41	03:53:30
KLX04	906.16-926.16	3	1	2004-08-31	2004-08-31
		C	·	06:18:18	07:44:49
KI X04	926 18-946 18	3	1	2004-08-31	2004-08-31
	020.10 010.10	0	•	08.16.13	09:47:07
KI X04	943 05-963 05	3	1	2004-08-31	2004-08-31
	010.00 000.00	0	•	10.30.31	12.18.04
KI X04	963 05-983 05	З	1	2004-08-31	2004-08-31
	505.00-505.05	0	•	12.24.06	11.12.20
KI X04	300 /1 305 /1	з	1	2004 00 04	17.12.28
112/04	500.41-505.41	5	I	2004-09-01 10-20-22	2004-09-01 11·50·15
KI X04	305 /1 310 /1	Skinned	1	2004 00 04	2004 00 01
	505.41-510.41	Skipped	I	13.06.54	14.06.27
				13.00.54	14.00.37

Bh ID	Test section (m)	Test type¹	Test no	Test start Date, time	Test stop Date, time
KLX04	310.42-315.42	3	1	2004-09-01	2004-09-01
				14:43:25	15:54:17
KLX04	315.43–320.43	3	1	2004-09-01	2004-09-01
				16:25:29	18:07:41
KLX04	320.43-325.43	3	1	2004-09-01	2004-09-01
				18:55:20	20:41:21
KLX04	325.44–330.44	3	1	2004-09-01	2004-09-02
				23:17:47	01:02:45
KLX04	330.44–335.44	3	1	2004-09-02	2004-09-02
				05:51:47	07:06:40
KLX04	335.44–340.44	3	1	2004-09-02	2004-09-02
				07:47:26	08:53:02
KLX04	340.44–345.44	3	1	2004-09-02	2004-09-02
				09:24:14	10:31:13
KLX04	345.44–350.44	3	1	2004-09-02	2004-09-02
				11:09:34	12:32:51
KLX04	350.45-355.45	3	1	2004-09-02	2004-09-02
				13:20:22	14:49:35
KLX04	355.47-360.47	3	1	2004-09-02	2004-09-02
				15:14:53	16:29:18
KLX04	360.47-365.47	3	1	2004-09-02	2004-09-02
		-	-	16:57:00	18:05:39
KI X04	365 47-370 47	3	1	2004-09-02	2004-09-02
		Ū	·	20:18:56	21:54:57
KI X04	370 47-375 47	3	1	2004-09-02	2004-09-03
		U	·	22:36:42	00.16.41
KI X04	375 47-380 47	3	1	2004-09-03	2004-09-03
	010.11 000.11	U	·	05:55:55	07:06:07
KI X04	380 47-385 47	3	1	2004-09-03	2004-09-03
	000.11 000.11	U	·	07:31:23	08:51:24
KI X04	385 47-390 47	4	1	2004-09-03	2004-09-03
	000.11 000.11	-	·	00.25.18	11:06:17
KI X04	390 48-395 48	4	1	2004-09-03	2004-09-03
KEX04	000.40 000.40	-	I	12.21.21	13.42.29
KI X04	395 48-400 48	4	1	2004-09-03	2004-09-03
KEX04	000.40 400.40	7	I	14.00.42	15:43:38
KI X04	400 48-405 48	з	1	2004-09-03	2004-09-03
KLX04	400.40-400.40	5	I	16:10:36	17:40:58
KI X04	405 49-410 49	з	1	2004-09-03	2004-09-03
	+00.+0-+10.+9	0		18:30:04	20003-03
KI X04	410 50-415 50	з	1	2004-09-03	20.00.00
	+10.00-410.00	5	I	200 4 -03-03	2004-08-03
KI VOA	115 51 100 54	3	1	21.22.21	20.01.24
112/04	415.51-420.51	3	I	2004-09-03	2004-09-04
	420 51 425 54	4	1	20.00.00	01.10.21 2004 00 04
	420.01-420.01	4	I	2004-03-04	2004-03-04
				00.01.13	07.20.09

Bh ID	Test section (m)	Test type¹	Test no	Test start Date, time	Test stop Date, time
KLX04	425.51-430.51	4	1	2004-09-04	2004-09-04
				07:55:22	09:06:52
KLX04	430.51–435.51	3	1	2004-09-04	2004-09-04
				09:37:27	11:35:43
KLX04	435.50–440.50	Skipped	1	2004-09-04	2004-09-04
				12:31:45	13:31:13
KLX04	440.50-445.50	3	1	2004-09-04	2004-09-04
				14:00:55	15:07:58
KLX04	445.50-450.50	4	1	2004-09-04	2004-09-04
				15:38:04	17:26:25
KLX04	450.50-455.50	3	1	2004-09-04	2004-09-04
				18:04:40	19:32:27
KLX04	455.50-460.50	4	1	2004-09-04	2004-09-04
				20:00:04	22:34:43
KLX04	460.51-465.51	3	1	2004-09-04	2004-09-05
				23:06:16	00:34:42
KLX04	465.52-470.52	3	1	2004-09-05	2004-09-05
				01:14:48	02:44:26
KLX04	470.52-475.52	Skipped	1	2004-09-05	2004-09-05
				05:46:55	06:52:10
KLX04	475.52–480.52	Skipped	1	2004-09-05	2004-09-05
				07:27:47	08:31:12
KLX04	480.52-485.52	3	1	2004-09-05	2004-09-05
				08:57:37	10:00:55
KLX04	505.55–510.55	Skipped	1	2004-09-05	2004-09-05
				10:34:20	12:06:53
KLX04	510.56–515.56	3	1	2004-09-05	2004-09-05
				12:46:44	13:58:28
KLX04	515.56-520.56	3	1	2004-09-05	2004-09-05
				14:22:14	15:34:00
KLX04	520.57-525.57	3	1	2004-09-05	2004-09-05
				16:00:31	17:24:02
KLX04	545.62-550.62	Skipped	1	2004-09-05	2004-09-05
				18:17:40	19:22:54
KLX04	550.62-555.62	3	1	2004-09-05	2004-09-05
				20:03:24	21:30:37
KLX04	555.63-560.63	3	1	2004-09-05	2004-09-06
				22:32:51	00:17:10
KLX04	560.63-565.63	3	1	2004-09-06	2004-09-06
				00:46:02	02:36:24
KLX04	565.64–570.64	3	1	2004-09-06	2004-09-06
				06:09:44	07:11:55
KLX04	570.64–575.64	3	1	2004-09-06	2004-09-06
				07:42:56	08:47:00
KLX04	575.65–580.65	3	1	2004-09-06	2004-09-06
				09.15.59	10 19 26

Bh ID	Test section (m)	Test type¹	Test no	Test start Date, time	Test stop Date, time
KLX04	580.65-585.65	3	1	2004-09-06	2004-09-06
				10:50:59	12:11:25
KLX04	585.67–590.67	3	1	2004-09-06	2004-09-06
				13:11:11	14:14:45
KLX04	590.67–595.67	3	1	2004-09-06	2004-09-06
				14:45:17	15:52:28
KLX04	595.69–600.69	Skipped	1	2004-09-06	2004-09-06
				16:36:19	18:14:00
KLX04	600.69–605.69	3	1	2004-09-06	2004-09-06
				18:43:02	20:11:31
KLX04	605.69–610.69	3	1	2004-09-06	2004-09-06
				20:57:59	22:11:39
KLX04	610.70–615.70	3	1	2004-09-06	2004-09-07
				22:41:44	00:09:18
KLX04	615.70–620.70	3	1	2004-09-07	2004-09-07
				00:39:07	02:03:42
KLX04	620.71–625.71	3	1	2004-09-07	2004-09-07
				06:12:03	07:18:38
KLX04	625.71–630.71	3	1	2004-09-07	2004-09-07
				07:41:43	08:50:10
KLX04	630.72–635.72	Skipped	1	2004-09-07	2004-09-07
				09:16:36	10:15:08
KLX04	635.72–640.72	Skipped	1	2004-09-07	2004-09-07
				10:44:34	11:53:22
KLX04	640.73–645.73	Skipped	1	2004-09-07	2004-09-07
				12:29:09	13:29:18
KLX04	645.73–650.73	3	1	2004-09-07	2004-09-07
				14:03:17	15:10:29
KLX04	650.74–655.74	3	1	2004-09-07	2004-09-07
				15:37:39	17:38:03
KLX04	655.75–660.75	3	1	2004-09-07	2004-09-07
				18:16:32	20:10:39
KLX04	660.75–665.75	Skipped	1	2004-09-07	2004-09-07
				22:36:43	23:37:39
KLX04	665.76–670.76	3	1	2004-09-08	2004-09-08
				00:22:39	02:26:54
KLX04	670.76–675.76	3	1	2004-09-08	2004-09-08
				10:39:01	12:33:15
KLX04	675.77–680.77	4	1	2004-09-08	2004-09-08
				14:08:21	15:45:31
KLX04	680.78–685.78	4	1	2004-09-08	2004-09-08
				16:18:01	17:35:50

1, 3: Injection test; 4: Pulse injection test.

No other additional measurements except the actual hydraulic tests and related measurements of packer position and water level in annulus of borehole KLX04 were conducted.

3.3 Control of equipment

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

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

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

4 Equipment

4.1 Description of equipment

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

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.



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

PSS2 is documented in photographs 1-6.



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 (\pm 1.0) kN. The gauge carrier is covered by split pipes and connected to a stone catcher on the top.
- Pop joint SS 1.0 or 0.5 m with OD 33 mm and ID 21 mm, double O-ring fittings, trapezoid thread, friction loss of 3kPa/m at 50 L/min.
- Pipe string SS 3.0 m with OD 33 mm and ID 21 mm, double O-ring fittings, trapezoid thread, friction loss of 3 kPa/m at 50 L/min.
- Contact carrier SS 1.0 m carrying connections for sensors below.
- Upper packer SS and PUR 1.5 m with OD 72 mm, fixed ends, seal length 1.0 m, maximum pressure 6.5 MPa, working pressure 1.6 MPa.
- Breakpin SS 250 mm with OD 33.7 mm. Maximum load of 47.3 (\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 4-2.



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

4.2 Sensors

Table 4-1.	Technical	specifications	of	sensors.
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Keyword	Sensor	Name	Value/range	Unit	Comments
p _{sec,a,b}	Pressure	Druck PTX 162-	9–30	VDC	
		1464abs	4–20 0–13.5 Resolution Accuracy	mA MPa % of FS	
T _{sec,surf,air}	Temperature	BGI	18–24	VDC	
			4–20	mA	
			0–32	°C	
			0.1	°C	

Keyword	Sensor	Name	Value/range	Unit	Comments
Q _{big}	Flow	Micro motion	0–100	kg/min	Massflow
		Elite sensor	± 0.1	%	
Q_{small}	Flow	Micro motion	0–1.8	kg/min	Massflow
		Elite sensor	± 0.1	%	
p _{air}	Pressure	Druck PTX 630	9–30	VDC	
			4–20	mA KDa	
			0–120	% of FS	
			± 0.1		
\mathbf{p}_{pack}	Pressure	Druck PTX 630	9–30	VDC	
			4–20	mA MBa	
			0–4	% of FS	
			± 0.1		
p _{in,out}	Pressure	Druck PTX 1400	9–28	VDC	
			4–20	mA MBa	
			0–2.5	MFa	
L	Level Indicator				Length correction

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

Borehole information			Sensors		Equipment affecting WBS coefficient		
ID	Test section (m)	Test no	Туре	Position (m fr ToC)	Position	Function	Outer diameter (mm)
KLX04 105.11–205.11	105.11–205.11	.11–205.11 1	pa	102.61	Test section	Signal cable	9.1
			р т	203.91		Pump string	33
			p₀ L	204.10 207.11 208.36		Packer line	6
KLX04	105.21–125.21 11 p _a 102.71 Test section p 124.01 T 124.26	Test section	Signal cable	9.1			
			p	124.01		Pump string	33
			p₀ L	127.21 128.46		Packer line	6
KLX04A	300.41–305.41	57	\mathbf{p}_{a}	297.91	Test section	Signal cable	9.1
			p	304.21		Pump string	33
			r p₅ L	307.41 308.66		Packer line	6

4.3 Data acquisition system

The data acquisition system in the PSS2 container contains a stationary PC with the software Orchestrator, pump- and injection tests parameters such as pressure, temperature and flow are monitored and sensor data collected. A second laptop PC is connected to the stationary PC through a network containing evaluation software, Flowdim. While testing, data from previously tested section is converted with IPPlot and entered in Flowdim for evaluation.

The data acquisition system starts and stops the test automatically or can be disengaged for manual operation of magnetic and regulation valves within the injection/pumping system.

The flow regulation board is used for differential pressure and valve settings prior testing and for monitoring valves during actual test. An outline of the data acquisition system is outlined in Figure 4-3.



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

5 Execution

5.1 Preparations

Following preparation work and functional checks were conducted prior to starting test activities:

- Place pallets and container, lifting rig up, installing fence on top of container, lifting tent on container.
- Clean and desinfect of Multikabel and hoses for packer and test valve. Clean the tubings with hot steam and chloride dioxide.
- Clean tanks with chloride dioxide. Filling injection tank with water out of the borehole
- Filling buffer tank with water.
- Filing vessels.
- Filling the hoses for test valve and packer.
- Entering calibration constants to system and regulation unit.
- Synchronize clocks on all computers.
- Function check of shut-in tool both ends, overpressure by 900 kPa for 5 min (OK).
- Check pressure gauges against atmospheric pressure and than on test depth against column of water.
- Translate all protocols into English (where necessary).
- Filling packers with water and de-air.
- Measure and assemble test tool.

5.2 Length correction

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

5.3 Execution of tests/measurements

5.3.1 Test principle

The tests were conducted as constant pressure injection (CHi phase) followed by a shut-in pressure recovery (CHir phase). In some cases, when the test section transmissivity was too low (typically lower than 1E–9 m²/s) no measurable flow could be registered during the CHi phase (Q < 1 mL/min). In such cases, Puls or Slug tests were conducted as active tests (Figure 5-1).



Figure 5-1. Flow chart for test performance.

5.3.2 Test procedure

A test cycle includes the following phases: 1) Transfer of down-hole equipment to the next section. 2) Packer inflation. 3) Pressure stabilisation. 4) Constant head injection. 5) Pressure recovery. 6) Packer deflation. The injection tests in KLX04 has been carried out by applying a constant injection pressure of ca 200 kPa (20 m water column) above the static formation pressure in the test section. Before start of the injection tests, approximately stable pressure conditions prevailed in the test section. After the injection period, the pressure recovery in the section was measured. In some cases, if small flow rates were expected, the automatic regulation unit was switched off and the test was performed manually. In other cases, where small flow rates (Q < 1 mL/min) were observed, the test procedure was switched to a pulse test performance. For the performance of a pulse test the shut-in tool has been closed immediately after starting the injection.

The duration for each phase is presented in Table 5-1.

In some cases injection and recovery phases were prolonged. This was due to testing zones of high interest for example high flow zones or low flow zones.

 Table 5-1. Durations for packer inflation, pressure stabilisation, injection and recovery phase and packer deflation in KLX04.

Position test tool to new test section (correct position using the borehole markers)	Approx 30 min
Inflate packers with 1900 kPa	25 min
Close test valve	10 min
Check tubing integrity with 800 kPa	5 min
De-air system	2 min
Set automatic flow control parameters	5 min
Start injection	20 to 45 min*
Close test valve, start recovery	20 min. or more
Open test valve	10 min
Deflate packers	25 min
Move to next test depth	

* In case of a Pulse Injection the injection time is shorter than 1 min.

5.4 Data handling

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

5.5 Analyses and interpretation

5.5.1 Analysis software

The tests were analysed using a type curve matching method. The analysis was performed using Golder's test analysis program FlowDim. FlowDim is an interactive analysis environment allowing the user to interpret constant pressure, constant rate and slug/pulse tests in source as well as observation boreholes. The program allows the calculation of type-curves for homogeneous, dual porosity and composite flow models in variable flow geometries from linear to spherical.

5.5.2 Analysis approach

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

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

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

5.5.3 Analysis methodology

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

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

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

• Pulse Injection Tests.

A test is always initiated as a constant pressure injection. However, if after a few seconds of injection the rate quickly drops to zero, this indicates a very tight section. It is then decided to close the test valve and measure the pressure recovery. The pressure recovery is analysed as a pulse injection phase (PI).

During the brief injection phase a small volume is injected (derived from the flowmeter measurements). This injected volume produces the pressure increase of dp. Using a dV/dp approach, the wellbore storage coefficient relevant for the subsequent pressure recovery can be calculated. It should be noted though that there is large uncertainty connected with the determination of the wellbore storage coefficient (probably one order of magnitude), which will implicitly translate into uncertainty in the derived transmissivity. Figure 5-2 below show an example of a typical pressure versus time evolution for such a tight section.

- Calculation of initial estimates of the model parameters by using the Ramey Plot /Ramey et al. 1975/. This is plot is typically not presented in the appendix.
- Flow model identification and type curve analysis in the deconvolution Peres Plot /Peres et al. 1989; Chakrabarty and Enachescu, 1997/. A non-linear regression algorithm is used to provide optimized model parameters in the later stages. An Example of the type curves is presented in Figure 5-3.



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



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

5.5.4 Steady state analysis

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

5.5.5 Flow models used for analysis

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

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

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

The flow dimension displayed by the test can be diagnosed from the slope of the pressure derivative. A slope of 0.5 indicates linear flow, a slope of 0 (horizontal derivative) indicates radial flow and a slope of -0.5 indicates spherical flow. The flow dimension diagnosis was commented for each of the tests. At tests where a flow regime could not clearly identified from the test data, we assume in general a radial flow regime as the most simple flow model available. The value of p* was then calculated according to this assumption.

In cases when the infinite acting radial flow (IARF) phase was not supported by the data the derivative was extrapolated using the most conservative assumption, which is that the derivative would stabilise short time after test end. In such cases the additional uncertainty was accounted for in the estimation of the transmissivity confidence ranges.

5.5.6 Calculation of the static formation pressure and equivalent freshwater head

The static pressure measured at transducer depth, was derived from the pressure recovery (CHir) following the constant pressure injection phase by using straight line or type curve extrapolation in the Horner plot.

The equivalent freshwater head (expressed in meters above sea level) was calculated from the static formation pressure, corrected for athmospheric pressure measured by the surface gauge and corrected for the vertical depth considering the inclination of the drillhole, by assuming a water density of 1,000 kg/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 5-4 shows the methodology schematically.

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

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

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

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

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



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

5.5.7 Derivation of the recommended transmissivity and the confidence range

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

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

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

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

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

6 Results

In the following, results of all tests are presented and analysed. Chapter 6.1 presents the 100 m tests, 6.2 the 20 m tests and 6.3 the 5 m tests. The results are given as general comments to test pereformance, the identified flow regimes and calculated parameters and finally the parameters which are considered as most representative are chosen and justification is given. All results are also summarised in Table 7-1 and 7-2 of the Synthesis chapter.

6.1 100 m single-hole injection tests

In the following, the 100 m section tests conducted in borehole KLX04 are presented and analysed.

6.1.1 Section 105.11–205.11 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 195 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate control during the CHi phase was good. The injection rate decreased from 11.6 L/min at start of the CHi phase to 10.0 L/min at the end, indicating a relatively high interval transmissivity. The injection phase (Chi) and the recovery phase (CHir) 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 loglog coordinates. In case of the present test both phases show a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). An infinite acting homogeneous radial flow model was chosen for the analysis of the phases. The analysis is presented in Appendix 2-1.

Selected representative parameters

The recommended transmissivity of $2.2E-5 \text{ m}^2/\text{s}$ was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 8.0E-6 to $4.0E-5 \text{ m}^2/\text{s}$. 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 1,986.4 kPa.

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

6.1.2 Section 205.34–305.34 m, tests no 1 and 2, injection

Comments to test

The first test conducted in this section was repeated due to technical problems with the regulation unit. The Cartesian plots of both tests are shown in the appendix. Only the second test was analysed.

The test was composed of a constant pressure injection test phase with a pressure difference of 20 kPa, followed by a pressure recovery phase. This very high flow zone did not allow a higher pressure difference with a flow of around 30 L/min. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate control during the CHi phase was done manual, because the system could not regulate it. The injection rate decreased from 39.2 L/min at start of the CHi phase to 27.6 L/min at the end, indicating a very high interval transmissivity. The recovery phase (CHir) shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

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

Selected representative parameters

The recommended transmissivity of $2.1E-4 \text{ m}^2/\text{s}$ was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 1.0E-4 to $4.0E-4 \text{ m}^2/\text{s}$. 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 2,966.1 kPa.

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

6.1.3 Section 305.41–405.41 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 203 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate control during the CHi phase was good. The injection rate decreased from 12.1 L/min at start of the CHi phase to 9.8 L/min at the end, indicating a relatively high interval transmissivity. Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase and the CHir phase show a flat derivative at late times, indicating a flow dimension of 2 (radial flow). An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-3.

Selected representative parameters

The recommended transmissivity of $5.4E-5 \text{ m}^2/\text{s}$ was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 7.5E-6 to $6.5E-5 \text{ m}^2/\text{s}$. 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 3,943.1 kPa.

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

6.1.4 Section 405.49–505.49 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate control during the beginning of the CHi phase was not very good. After 2 minutes the regulation system managed to get stable flow conditions. The injection rate decreased from 0.62 L/min at start of the CHi phase to 0.50 L/min at the end, indicating a moderate interval transmissivity. The recovery shows a very quick stabilization. Both phases are amenable for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase and the CHir phase show a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). An infinite acting homogeneous radial flow model was chosen for the analysis of the two phases. The analysis is presented in Appendix 2-4

Selected representative parameters

The recommended transmissivity of $1.0E-6 \text{ m}^2/\text{s}$ was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 5.0E-7 to $2.0E-6 \text{ m}^2/\text{s}$. 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 4,924.2 kPa.

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

6.1.5 Section 505.55–605.55 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 4.99 L/min at start of the CHi phase to 3.43 L/min at the end, indicating a relatively high interval transmissivity. Both phases are amenable for quantitative analysis.
The flow dimension is interpreted from the slope of the semi-log derivative plotted in loglog coordinates. In case of the present test the CHi phase shows a flat derivative at middle times, which is indicative of a flow dimension of 2 (radial flow). At late times the derivative does not look very stable and shows an upward trend followed by a downward slope. The CHir phase derivative shows an downward trend at late times indicating an increase of transmissivity at some distance from the borehole. An infinite acting homogeneous radial flow model was chosen for the analysis of the Chi phase. For the analysis of the CHir phase a radial composite flow model was chosen. The analysis is presented in Appendix 2-5.

Selected representative parameters

The recommended transmissivity of $4.1E-6 \text{ m}^2/\text{s}$ was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 1.0E-7 to $5.0E-6 \text{ m}^2/\text{s}$. 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 5,905.1 kPa.

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

6.1.6 Section 605.69–705.69 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 3.55 L/min at start of the CHi phase to 2.76 L/min at the end, indicating a relatively high interval transmissivity. Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a flat derivative at late times and the Chir phase shows a flat derivative at middle times, indicating a flow dimension of 2 (radial flow). The CHir phase derivative shows an downward trend at late times indicating an increase of transmissivity at some distance from the borehole. An infinite acting homogeneous radial flow model was chosen for the analysis of the CHir phase a radial composite flow model was chosen. The analysis is presented in Appendix 2-6.

Selected representative parameters

The recommended transmissivity of $3.9E-6 \text{ m}^2/\text{s}$ was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 2.0E-6 to $5.0E-6 \text{ m}^2/\text{s}$. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 6,882.9 kPa.

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

6.1.7 Section 705.81–805.81 m, test no 1, pulse injection

Comments to test

The test was initiated as a constant pressure injection. However, after a few seconds of injection the rate quickly dropped to zero, indicating a very tight section. It was therefore decided to close the test valve and measure the pressure recovery. The pressure recovery was analysed as a pulse injection phase (PI).

During the brief injection phase a total volume of 0.027 L was injected (derived from the flowmeter measurements. This injected volume produced a pressure increase of 200 kPa. Using a dV/dP approach, the wellbore storage coefficient relevant for the subsequent pressure recovery can be calculated to 1.4E-10 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.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the Pi phase shows a flat derivative at middle times, which is indicative of a flow dimension of 2 (radial flow). At late times it shows an upward trend, indicating a decrease of transmissivity at some distance from the borehole. For the analysis a radial composite flow model was chosen. The analysis is presented in Appendix 2-7.

Selected representative parameters

The recommended transmissivity of $3.5E-10 \text{ m}^2/\text{s}$ was derived from the analysis of the Pi phase. It should be noted that due to the very low interval transmissivity the results are very uncertain. The confidence range for the interval transmissivity is estimated to be 8.0E-11 to $7.0E-10 \text{ m}^2/\text{s}$. The flow dimension displayed during the test is 2. No static pressure could be derived.

6.1.8 Section 805.98–905.98 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The system needed more than two minutes to get stable flow conditions, due to the small injection rates the rate measurements are relatively noisy. The injection rate decreased from 76.0 mL/min at start of the CHi phase to 52.3 mL/min at the end, indicating a relatively low interval transmissivity. The data of the CHi phase are for middle and late times amenable for quantitative analysis. The CHir phase shows relatively fast recovery, however, the data is of good quality and as such, amenable for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in loglog coordinates. In case of the present test the CHi phase shows a flat derivative at middle times, which is indicative of a flow dimension of 2 (radial flow). At late times it shows an upward trend which could indicate a transition to a zone of lower transmissivity in some distance of the borehole. The CHir phase does not allow for a specific determination of the flow dimension. An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-8.

Selected representative parameters

The recommended transmissivity of $4.3E-8 \text{ m}^2/\text{s}$ was derived from the analysis of the CHi phase, which is the phase that shows infinite acting radial flow. The confidence range for the interval transmissivity is estimated to be 2.0E-8 to $8.0E-8 \text{ m}^2/\text{s}$. 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 8,838.7 kPa.

The analysis of the CHi and CHir phases shows some inconsistency, essentially caused by the fast recovery of the CHir phase and the fact that infinite acting radial flow was not measured during the recovery phase.

6.1.9 Section 886.11–986.11 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. The pressure in the bottom zone increases during the injection, indicating a connection to the interval through fractures. The injection rate control during the CHi phase was good. The injection rate decreased from 2.23 L/min at start of the CHi phase to 0.89 L/min at the end, indicating a moderate interval transmissivity. The data quality of both phases is good and as such adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase and the CHir phase show a flat derivative at middle times, which is indicative of a flow dimension of 2 (radial flow). The derivative of the Chi phase shows an upward trend at late times, indicating a transition to a zone of lower transmissivity in some distance of the borehole or a change in flow dimension. For the analysis a radial composite flow model was chosen for both phases. The analysis is presented in Appendix 2-9.

Selected representative parameters

The recommended transmissivity of $8.2E-7 \text{ m}^2/\text{s}$ was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 6.0E-7 to $1.0E-6 \text{ m}^2/\text{s}$. 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 9,623.8 kPa.

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

6.2 20 m single-hole injection tests

In the following, the 20 m section tests conducted in borehole KLX04 are presented and analysed.

6.2.1 Section 105.21–125.21 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate control during the CHi phase was good. The injection rate decreased from 4.07 L/min at start of the CHi phase to 3.00 L/min at the end, indicating a relatively high interval transmissivity. The recovery phase (CHir) shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHir phase shows a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). The data of the CHi phase does not allow for a specific determination of the flow dimension. It was analysed assuming a flow dimension of 2. The derivative shows an upward trend at late times. This part was not analysable. For the analysis of both phases a radial composite flow model was chosen. The analysis is presented in Appendix 2-10

Selected representative parameters

The recommended transmissivity of $2.6E-6 \text{ m}^2/\text{s}$ was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 9.0E-7 to $5.0E-6 \text{ m}^2/\text{s}$. 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 1,209.2 kPa.

The analysis of the CHi and CHir phases shows consistency. In case further analysis is planned, we recommend conducting a full superposition transient analysis in order to account for pressure history effects and changing flow rates during the CHi phase.

6.2.2 Section 125.25–145.25 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate control during the CHi phase was not very good at the beginning. The injection rate decreased from 0.22 L/min at start of the CHi phase to 0.19 L/min at the end, indicating a relatively moderate interval transmissivity. 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 loglog coordinates. In case of the present test the CHi phase shows a flat derivative at middle times, which is indicative of a flow dimension of 2 (radial flow). At late times it shows an upward trend, indicating a transition to a zone of lower transmissivity at some distance from the borehole. The CHir phase derivative is flat at late times. An infinite acting homogeneous radial flow model was chosen for the analysis of the Chir phase. For the analysis of the CHi phase a radial composite flow model was chosen. The analysis is presented in Appendix 2-11.

Selected representative parameters

The recommended transmissivity of $5.6E-7 \text{ m}^2/\text{s}$ was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 1.0E-7 to $7.0E-7 \text{ m}^2/\text{s}$. 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 1,402.5 kPa.

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

6.2.3 Section 145.30–165.30 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate control during the beginning of the CHi phase was not very good. In addition, due to the small injection rates (low transmissivity) the rate measurements are relatively noisy. The injection rate decreased from 53.4 mL/min at start of the CHi phase to 43.2 mL/min at the end, indicating a relatively low interval transmissivity. Both phases are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a flat derivative at middle and late times, which is indicative of a flow dimension of 2 (radial flow). The data quality of the CHir phase does not allow for a specific determination of the flow dimension. The analysis was conducted assuming a flow dimension of 2. An infinite acting homogeneous radial flow model was chosen for the analysis of the Chi phase. For the analysis of the CHir phase a radial composite flow model was chosen. The analysis is presented in Appendix 2-12.

Selected representative parameters

The recommended transmissivity of $5.8E-8 \text{ m}^2/\text{s}$ was derived from the analysis of the Chi, which shows a clear infinite acting radial flow and the best derivative quality. The confidence range for the interval transmissivity is estimated to be 2.0E-8 to $7.0E-8 \text{ m}^2/\text{s}$. 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 1,597.2 kPa.

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

6.2.4 Section 165.30–185.30 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate control during the CHi phase was good. The injection rate decreased from 0.76 L/min at start of the CHi phase to 0.53 L/min at the end, indicating a moderate interval transmissivity. The data of the Chi phase are of good quality and adequate for quantitative analysis. The CHir phase shows very fast recovery, such that the analysis does not provide reliable results. The results should be regarded as order of magnitude only.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in loglog coordinates. In case of the present test the CHi phase shows a flat derivative at middle and late times, which is indicative of a flow dimension of 2 (radial flow). The data quality of the CHir phase does not allow for a specific determination of the flow dimension. An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-13.

Selected representative parameters

The recommended transmissivity of $5.4E-7 \text{ m}^2/\text{s}$ was derived from the analysis of the Chi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 3.0E-7 to $7.0E-7 \text{ m}^2/\text{s}$. 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 1,792.2 kPa.

The analysis of the CHi and CHir phases shows some inconsistency, essentially caused by the fast recovery of the CHir phase and from this resulting data quality of this phase.

6.2.5 Section 185.32–205.32 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate control during the CHi phase was good. After one third of the flow period it shows a relatively fast decrease of the flow rate for which the reason is unknown. The injection rate decreased from 7.10 L/min at start of the CHi phase to 5.81 L/min at the end, indicating a relatively high interval transmissivity. The CHir phase shows relatively fast recovery, however, the data is of good quality and as such, amenable for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase and the CHir phase show a flat derivative at late times, which is indicative for a flow dimension of 2 (radial flow). For the analysis of the Chi phase, only the last part was chosen. An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-14.

Selected representative parameters

The recommended transmissivity of $5.9E-6 \text{ m}^2/\text{s}$ was derived from the analysis of the CHi phase. The confidence range for the interval transmissivity is estimated to be 4.0E-6 to $2.0E-5 \text{ m}^2/\text{s}$. 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 1.985.7 kPa.

The analysis of the CHi and CHir phases shows some inconsistency, mainly caused by the fast drop of flow rate after the first third of the flow period and the very fast recovery.

6.2.6 Section 205.34–225.34 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 100 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate control during the CHi phase needed about 90 seconds to get stable pressure and flow conditions. The injection rate decreased from 35.5 L/min at start of the CHi phase to 28.1 L/min at the end, indicating a very high interval transmissivity. The recovery phase (CHir) shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). The CHir phase shows a flat derivative, too. An infinite acting homogeneous radial flow model was chosen for the analysis of the CHir phase. For the analysis of the CHi phase a radial composite flow model was chosen. The analysis is presented in Appendix 2-15.

Selected representative parameters

The recommended transmissivity of $8.1E-5 \text{ m}^2/\text{s}$ was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 4.0E-5 to $9.0E-5 \text{ m}^2/\text{s}$. 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 2,181.6 kPa.

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

6.2.7 Section 225.35–245.35 m, tests no 1 and 2, injection

Comments to test

The first test conducted in this section was repeated due to the disturbance of pumping water from the annulus to the tank parallel to the running injection test. The Cartesian plots of both tests are shown in the appendix. Only the second test was analysed

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 1.35

L/min at start of the CHi phase to 0.82 L/min at the end, indicating a moderate interval transmissivity. The CHir phase shows very fast recovery, such that the analysis does not provide reliable results. The results should be regarded as order of magnitude only.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in loglog coordinates. In case of the present test the CHi phase shows a flat derivative at middle times, followed by an upward slope and a stabilisation at a higher level, which is indicative for a transition to a zone of lower transmissivity at some distance from the borehole. The CHir phase shows a flat derivative, indicating a flow dimension of 2 (radial flow). An infinite acting homogeneous radial flow model was chosen for the analysis of the CHir phase. For the analysis of the CHi phase a radial composite flow model was chosen. The analysis is presented in Appendix 2-16.

Selected representative parameters

The recommended transmissivity of $6.2E-7 \text{ m}^2/\text{s}$ was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 3.0E-7 to $8.0E-7 \text{ m}^2/\text{s}$. 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 2,380.9 kPa.

The analysis of the CHi and CHir phases shows some inconsistency, essentially caused by the fast recovery of the CHir phase.

6.2.8 Section 245.38–265.38 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate control during the CHi phase was good. The injection rate decreased from 19.9 mL/min at start of the CHi phase to 16.4 L/min at the end, indicating a high interval transmissivity. 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 CHir phase shows a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). The CHi phase derivative shows a downward trend at late times indicating an increase of transmissivity at some distance from the borehole. An infinite acting homogeneous radial flow model with wellbore storage and skin was chosen for the analysis of the CHir phase. For the analysis of the CHi phase a radial composite flow model was chosen. The analysis is presented in Appendix 2-17.

Selected representative parameters

The recommended transmissivity of $2.1E-5 \text{ m}^2/\text{s}$ was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the inter-

val transmissivity is estimated to be 9.0E-6 to 4.0E-5 m²/s. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 2,574.6 kPa.

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

6.2.9 Section 265.38–285.38 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 0.68 L/min at start of the CHi phase to 0.55 L/min at the end, indicating a relatively moderate interval transmissivity. The CHir phase shows relatively fast recovery, however, the data is of good quality and as such, amenable for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase and the CHir phase show a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). The CHi phase derivative shows a downward trend at middle times indicating an increase of transmissivity at some distance from the borehole. An infinite acting homogeneous radial flow model with wellbore storage and skin was chosen for the analysis of the CHir phase. For the analysis of the CHi phase a radial composite flow model was chosen. The analysis is presented in Appendix 2-18.

Selected representative parameters

The recommended transmissivity of $1.7E-6 \text{ m}^2/\text{s}$ was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 4.0E-7 to $2.0E-6 \text{ m}^2/\text{s}$. 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 2,771.1 kPa.

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

6.2.10 Section 285.40-305.40 m, tests no 1 and 2, injection

Comments to test

The first test conducted in this section was repeated due to technical problems with the pipe string. The Cartesian plots of both tests are shown in the appendix. Only the second test was analysed

The test was composed of a constant pressure injection test phase with a pressure difference of 35 kPa, followed by a pressure recovery phase. The system could not manage to get a higher pressure difference. A low pressure increase (5 kPa) in the bottom zone was observed, indicating a hydraulic connection between test interval and that zone. The injection rate control during the CHi phase was not very good. The system needed more than 10 minutes

to get stable pressure conditions. Only the very late times of the CHi phase are adequate for quantitative analysis. The injection rate decreased from 37.7 L/min at start of the CHi phase to 24.7 L/min at the end, indicating a very high interval transmissivity. The recovery phase (CHir) shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). The CHir phase derivative shows a downward trend at middle times indicating an increase of transmissivity at some distance from the borehole. An infinite acting homogeneous radial flow model was chosen for the analysis of the Chi phase. For the analysis of the CHir phase a radial composite flow model was chosen. The analysis is presented in Appendix 2-19.

Selected representative parameters

The recommended transmissivity of $5.1E-5 \text{ m}^2/\text{s}$ was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 4.0E-5 to $2.0E-4 \text{ m}^2/\text{s}$. 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 2,967.6 kPa.

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

6.2.11 Section 305.41–325.41 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 0.45 L/min at start of the CHi phase to 0.35 L/min at the end, indicating a relatively low interval transmissivity. The CHir phase shows very fast recovery, such that the analysis does not provide reliable results. The results should be regarded as order of magnitude only.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). At late times it shows an upward trend, indicating a decrease of transmissivity at some distance from the borehole. The CHir phase derivative is flat at late times. An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-20.

Selected representative parameters

The recommended transmissivity of $5.4E-7 \text{ m}^2/\text{s}$ was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 2.0E-7 to $7.0E-7 \text{ m}^2/\text{s}$. 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 3,161.4 kPa.

The analysis of the CHi and CHir phases shows some inconsistencies, essentially caused by the fast recovery of the CHir phase and from this resulting data quality of this phase.

6.2.12 Section 325.44-345.44 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate control during the CHi phase was good, but after about 12 minutes there was a sharp drop down in flow, however the pressure in the test section stayed stable. The reason for that is unknown. Therefore it was possible to analyse only the first part of the CHi phase. The injection rate decreased from 0.37 L/min at start of the CHi phase to 0.25 L/min at the end, indicating a relatively moderate interval transmissivity. The CHir phase shows very fast recovery, such that the analysis does not provide reliable results. The results should be regarded as order of magnitude only.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in loglog coordinates. In case of the present test the CHi phase shows a flat derivative at middle times before the sharp drop in flow, which is indicative of a flow dimension of 2 (radial flow). The CHir phase derivative is flat. An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-21.

Selected representative parameters

The recommended transmissivity of $8.8E-8 \text{ m}^2/\text{s}$ was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 7.0E-8 to $2.0E-7 \text{ m}^2/\text{s}$. 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 3,355.9 kPa.

The analysis of the CHi and CHir phases shows some inconsistency, essentially caused by the fast recovery of the CHir phase.

6.2.13 Section 345.44-365.44 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 13.1 L/min at start of the CHi phase to 9.3 L/min at the end, indicating a high interval transmissivity. Both phases 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 CHi phase and the CHir phase show a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). An infinite acting homogeneous radial flow model was chosen for the analysis of the Chi phase. The analysis is presented in Appendix 2-22.

Selected representative parameters

The recommended transmissivity of $5.6E-5 \text{ m}^2/\text{s}$ was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 8.0E-6 to $6.0E-5 \text{ m}^2/\text{s}$. 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 3,551.2 kPa.

The analysis of the CHi and CHir phases shows some inconsistency that should be resolved in case further analysis of the test is planned. In this case we recommend conducting a full superposition transient analysis in order to account for pressure history effects and changing flow rates during the CHi phase.

6.2.14 Section 365.47-385.47 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 0.54 L/min at start of the CHi phase to 0.41 L/min at the end, indicating a relatively low interval transmissivity. The CHir phase shows very fast recovery, such that the analysis does not provide reliable results. The results should be regarded as order of magnitude only.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase and the CHir phase show a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-23.

Selected representative parameters

The recommended transmissivity of $6.4E-7 \text{ m}^2/\text{s}$ was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 2.0E-7 to $8.0E-7 \text{ m}^2/\text{s}$. 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 3,748.2 kPa.

The analysis of the CHi and CHir phases shows some inconsistency, essentially caused by the fast recovery of the CHir phase and from this resulting data quality of this phase.

6.2.15 Section 385.47-405.47 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 245 kPa, followed by a pressure recovery phase. The test was accomplished without using the automatic regulation system. No hydraulic connection between test interval and the adjacent zones was observed. Due to the small injection rates the rate measurements are relatively noisy, but still adequate for quantitative analysis. The injection rate decreased from 10.9 mL/min at start of the CHi phase to 6.4 mL/min at the end, indicating a low interval transmissivity. The recovery phase (CHir) did not reach infinite acting radial flow (IARF) and as such the results should be regarded as order of magnitude only.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in loglog coordinates. In case of the present test the CHi phase shows, although it is noisy, a flat derivative at middle times, which is indicative of a flow dimension of 2 (radial flow). The CHir phase does not allow for a specific determination of the flow dimension. The analysis was conducted assuming a flow dimension of 2. Both phases were analysed using an infinite acting homogeneous radial flow model. The analysis is presented in Appendix 2-24.

Selected representative parameters

The recommended transmissivity of $4.4E-9 \text{ m}^2/\text{s}$ was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 2.0E-9 to $6.0E-9 \text{ m}^2/\text{s}$. 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 3,943.6 kPa.

The analysis of the CHi and CHir phases shows some inconsistencies, which are mainly caused by the fact that the CHir phase did not reach IARF.

6.2.16 Section 405.49-425.49 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 0.47 L/min at start of the CHi phase to 0.43 L/min at the end, indicating a relatively moderate interval transmissivity. Especially in the beginning, the data of the Chi phase are relatively noisy. The CHir phase shows very fast recovery, such that the analysis does not provide reliable results. The results should be regarded as order of magnitude only.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase and the CHir phase show a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). An infinite acting homogeneous radial flow model was chosen for the analysis of the CHir phase. For the analysis of the CHi phase a radial composite flow model was chosen. The analysis is presented in Appendix 2-25.

Selected representative parameters

The recommended transmissivity of $2.5E-6 \text{ m}^2/\text{s}$ was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 3.0E-7 to $4.0E-6 \text{ m}^2/\text{s}$. 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 4,139.8 kPa.

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

6.2.17 Section 425.52-445.52 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 198 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate control during the CHi phase was ok, but due to the small injection rates the rate measurements are relatively noisy. The injection rate decreased from 86.4 mL/min at start of the CHi phase to 61.2 mL/min at the end, indicating a relatively low interval transmissivity. The CHir phase shows very fast recovery, such that the analysis does not provide reliable results. The results should be regarded as order of magnitude only.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in loglog coordinates. In case of the present test the CHi and the CHir phase show a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. For the analysis of the CHir phase a radial composite flow model was chosen. The analysis is presented in Appendix 2-26.

Selected representative parameters

The recommended transmissivity of $5.7E-8 \text{ m}^2/\text{s}$ was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 3.0E-8 to $8.0E-8 \text{ m}^2/\text{s}$. 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 4,333.3 kPa.

The analysis of the CHi and CHir phases shows some inconsistencies, mainly caused by the fast recovery of the CHir phase and resulting data quality of this phase. No further analysis is recommended.

6.2.18 Section 445.50–465.50 m, tests no 1 and 2, injection

Comments to test

The first test conducted in this section was repeated due to technical problems with the flow meter. The Cartesian plots of both tests are shown in the appendix. Only the second test was analysed

The test was composed of a constant pressure injection test phase with a pressure difference of 225 kPa, followed by a pressure recovery phase. The test was accomplished without using the automatic regulation system. No hydraulic connection between test interval and the adjacent zones was observed. Due to the very small injection rates the rate measurements are relatively noisy, but still amenable for quantitative analysis. The injection rate decreased from 7.2 mL/min at start of the CHi phase to 3.3 mL/min at the end, indicating a low interval transmissivity. The recovery phase (CHir) shows no problems, but did not reach infinite acting radial flow and as such the results should be regarded as order of magnitude only.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). The CHir does not allow a specific determination of the flow dimension. An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-27.

Selected representative parameters

The recommended transmissivity of $8.2E-10 \text{ m}^2/\text{s}$ was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 7.0E-10 to $4.0E-9 \text{ m}^2/\text{s}$. 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 4,526.0 kPa.

The analysis of the CHi and CHir phases shows some inconsistencies, which are mainly caused by the low flow rate. No further analysis is recommended.

6.2.19 Section 465.52-485.52 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 209 kPa, followed by a pressure recovery phase. The test was accomplished without using the automatic regulation system. During the injection phase the pressure in the section decreased by 13 kPa. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 8.1 mL/min at start of the CHi phase to 3.3 mL/min at the end, indicating a low interval transmissivity. The recovery phase (CHir) shows no problems, but IARF was not measured. As such, the results of the CHir phase should be regarded as order of magnitude only.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a flat derivative at middle and late times, which is indicative of a flow dimension of 2 (radial flow). The data of the CHir phase does not allow for a specific determination of the flow dimension. The analysis was conducted assuming a flow dimension of 2. An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-28.

Selected representative parameters

The recommended transmissivity of $1.8E-8 \text{ m}^2/\text{s}$ was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 8.0E-9 to $4.0E-8 \text{ m}^2/\text{s}$. 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 4,723.8 kPa.

The analysis of the CHi and CHir phases shows some inconsistencies, mainly caused by the fact that no IARF was measured for the CHir phase. No further analysis is recommended.

6.2.20 Section 485.52–505.52 m, test no 1, pulse injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The flow rate was below the measurement limit, indicating a very low interval transmissivity. The test was analysed as a pulse injection (Pi).

During the injection phase a total volume of 0.022 L was injected (derived from the flowmeter measurements. This injected volume produced a pressure increase of 200 kPa. Using a dV/dP approach, the wellbore storage coefficient relevant for the subsequent pressure recovery can be calculated to 3.0E-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.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in loglog coordinates. In case of the present test, the data does not allow a specific determination of the flow dimension. The test was analysed assuming a flow dimension of 2 (radial flow). A two shell composite flow model was chosen for the analysis. The analysis is presented in Appendix 2-29.

Selected representative parameters

The recommended transmissivity derived from the analysis is $2.1E-10 \text{ m}^2/\text{s}$. It should be noted that due to the very low interval transmissivity the results are very uncertain. The confidence range for the interval transmissivity is estimated to be 1.0E-10 to $1.0E-9 \text{ m}^2/\text{s}$. The analysis was conducted using a flow dimension of 2. No static pressure could be derived.

6.2.21 Section 505.55–525.55 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate control during the CHi phase was good. The injection rate decreased from 2.25 L/min at start of the CHi phase to 1.85 L/min at the end, indicating a high interval transmissivity. Both phases 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 CHi phase and the CHir phase show a flat derivative at middle times, indicating a flow dimension of 2 (radial flow). At late times both phases show a downward trend, which is indicative for an increase of transmissivity at some distance from the borehole. For the analysis a radial composite flow model was chosen. The analysis is presented in Appendix 2-30.

Selected representative parameters

The recommended transmissivity of $2.1E-6 \text{ m}^2/\text{s}$ was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 9.0E-7 to $3.0E-6 \text{ m}^2/\text{s}$. 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 5,115.3 kPa.

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

6.2.22 Section 525.58-545.58 m, test no 1, pulse injection

Comments to test

The test was initiated as a constant pressure injection. However, after a few seconds of injection the rate quickly dropped to zero, indicating a very tight section. It was therefore decided to close the test valve and measure the pressure recovery. The pressure recovery was analysed as a pulse injection phase (PI).

During the brief injection phase a total volume of 6.95 mL was injected (derived from the flowmeter measurements. This injected volume produced a pressure increase of 204.9 kPa. Using a dV/dP approach, the wellbore storage coefficient relevant for the subsequent pressure recovery can be calculated to $3.4E-11 \text{ m}^3$ /Pa. It should be noted though that there is large uncertainty connected with the determination of the wellbore storage coefficient (probably one order of magnitude), which will implicitly translate into uncertainty in the derived transmissivity.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. The derivative of this test is flat at middle times, which is indicative of a flow dimension of 2 (radial flow). The PI phase derivative shows a downward trend at late times indicating an increase of transmissivity at some distance from the borehole. For the analysis a radial composite flow model was chosen. The analysis is presented in Appendix 2-31.

Selected representative parameters

The recommended transmissivity of $4.1E-10 \text{ m}^2/\text{s}$ was derived from the analysis of the Pi phase. Considering the inherent uncertainties related to the measurement (e.g. specially the measurement of the wellbore storage coefficient) and to the analysis process (e.g. numeric distortion when calculating the derivative and pressure history effects), the confidence range for the transmissivity is estimated to be 7E–11 to 7E–10 m²/s (the outer zone transmissivity

is considered as most representative). The flow dimension displayed during the test is 2. No static pressure could be derived.

6.2.23 Section 545.62–565.62 m, tests no 1 and 2, injection

Comments to test

The first test conducted in this section was repeated due to technical problems with the flow meter. The Cartesian plots of both tests are shown in the appendix. Only the second test was analysed

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. The test was accomplished without using the automatic regulation system. No hydraulic connection between test interval and the adjacent zones was observed. Due to the very small injection rates the rate measurements are relatively noisy, but still adequate for quantitative analysis. The injection rate decreased from 7.61 mL/min at start of the CHi phase to 3.28 mL/min at the end, indicating a low interval transmissivity. The recovery phase (CHir) shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). The data of the CHir phase does not allow for a specific determination of the flow dimension. An infinite acting homogeneous radial flow model was chosen for the analysis of the Chi phase and the CHir phase. The analysis is presented in Appendix 2-32.

Selected representative parameters

The recommended transmissivity of $1.3E-9 \text{ m}^2/\text{s}$ was derived from the analysis of the CHi phase, because during the CHir phase no infinite acting radial flow was measured, so that the results for the transmissivity are very uncertain. The confidence range for the interval transmissivity is estimated to be 9.0E-10 to $3.0E-9 \text{ m}^2/\text{s}$. 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 5,509.9 kPa.

The analysis of the CHi and CHir phases shows some inconsistencies, mainly caused due to the fact that IARF was not measured for the CHir phase. No further analysis is recommended.

6.2.24 Section 565.64–585.64 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate control during the beginning of the CHi phase was not very good. However, the second part of the CHi phase can be analysed quantitatively. The injection rate decreased from 66.8 mL/min at start of the CHi phase to 59.4 mL/min at the end, indicating a relatively low interval transmissivity. The CHi phase shows fast recovery, such that the analysis does not provide reliable results. The results should be regarded as order of magnitude only.

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). The CHir phase derivative does not allow a specific determination of the flow dimension, it was analysed using a flow dimension of 2. A two shell radial composite flow model was chosen for the analysis of the Chi phase. For the analysis of the CHir phase an infinite acting radial flow model with wellbore storage and skin was chosen. The analysis is presented in Appendix 2-33.

Selected representative parameters

The recommended transmissivity of $9.5E-7 \text{ m}^2/\text{s}$ was derived from the analysis of the CHi phase, which shows the best data and derivative quality and the most reliable results. The early time response of the CHi phase was regarded as skin, which is consistent with the CHir response. The confidence range for the interval transmissivity is estimated to be 3.0E-7 to $1.0E-6 \text{ m}^2/\text{s}$. 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 5,706.9 kPa.

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

6.2.25 Section 585.65-605.65 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. The pressure in the bottom zone rose a little (3 kPa) during the injection phase, indicating a connection between the interval and the bottom zone. The injection rate decreased from 1.83 L/min at start of the CHi phase to 1.24 L/min at the end, indicating a relatively high interval transmissivity. The CHir phase shows relatively fast recovery, however, the data is of good quality and as such, amenable for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in loglog coordinates. In case of the present test the CHi phase shows a flat derivative at middle and late times, which is indicative of a flow dimension of 2 (radial flow). The CHir phase derivative shows a downward trend at late times indicating an increase of transmissivity at some distance from the borehole. An infinite acting homogeneous radial flow model was chosen for the analysis of the Chi phase. For the analysis of the CHir phase a radial composite flow model was chosen. The analysis is presented in Appendix 2-34.

Selected representative parameters

The recommended transmissivity of $1.2E-6 \text{ m}^2/\text{s}$ was derived from the analysis of the CHi phase, which shows the best derivative quality. The confidence range for the interval transmissivity is estimated to be 8.0E-7 to $4.0E-6 \text{ m}^2/\text{s}$. 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 5,904.6 kPa.

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

6.2.26 Section 605.69-625.69 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. The pressure in the bottom zone rose by 11 kPa during the injection, indicating a connection to the interval. The injection rate control during the CHi phase was good. The injection rate decreased from 2.48 L/min at start of the CHi phase to 1.97 L/min at the end, indicating a relatively high interval transmissivity. The CHir phase shows relatively fast recovery, however, the data is of good quality and as such, amenable for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase and the CHir phases show a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). An infinite acting homogeneous radial flow model was chosen for the analysis of the Chi phase. For the analysis of the CHir phase an infinite acting radial flow model with wellbore storage and skin was chosen. The analysis is presented in Appendix 2-35.

Selected representative parameters

The recommended transmissivity of $3.0E-6 \text{ m}^2/\text{s}$ was derived from the analysis of the CHi phase, which shows the best data and derivative quality. It should be noted, that the results are uncertain, due to the connection to the lower section. The confidence range for the interval transmissivity is estimated to be 1.0E-6 to $6.0E-6 \text{ m}^2/\text{s}$. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 6,101.9 kPa.

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

6.2.27 Section 625.71–645.71 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 2.37 L/min at start of the CHi phase to 1.93 L/min at the end, indicating a relatively high interval transmissivity. Both phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase and the CHir phase show a flat derivative at middle times, which is indicative of a flow dimension of 2 (radial flow). At late times both phases show a downward trend, indicating an increase of transmissivity at some

distance from the borehole. For the analysis of both phases a radial composite flow model was chosen. The analysis is presented in Appendix 2-36.

Selected representative parameters

The recommended transmissivity of $2.2E-6 \text{ m}^2/\text{s}$ was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 1.0E-6 to $4.0E-6 \text{ m}^2/\text{s}$. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 6,296.5 kPa.

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

6.2.28 Section 645.73-665.73 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 219 kPa, followed by a pressure recovery phase. The test was accomplished without using the automatic regulation system. No hydraulic connection between test interval and the adjacent zones was observed. Due to the small injection rates the rate measurements are relatively noisy, however, the data is amenable for quantitative analysis. The injection rate decreased from 9.81 mL/min at start of the CHi phase to 4.90 mL/min at the end, indicating a low interval transmissivity. The recovery phase (CHir) is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). The CHir phase derivative does not allow a specific determination of the flow dimension, the test was analysed assuming a flow dimension of 2. An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-37.

Selected representative parameters

The recommended transmissivity of $2.5E-9 \text{ m}^2/\text{s}$ was derived from the analysis of the CHi phase, because the CHir phase does not clearly show an infinite acting radial flow. The confidence range for the interval transmissivity is estimated to be 9.0E-10 to $4.0E-9 \text{ m}^2/\text{s}$. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 6,487.5 kPa.

Considering the low flow rates, the analysis of the CHi and CHir phases shows good consistency. No further analysis is recommended.

6.2.29 Section 665.76–685.76 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 210 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate control during the CHi phase was not very good. The injection rate decreased from 0.38 L/min at start of the CHi phase to 0.11 L/min at the end, indicating a relatively moderate interval transmissivity. The recovery phase (CHir) shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test both phases show a flat derivative at middle times, which is indicative of a flow dimension of 2 (radial flow). At late times both derivatives show an upward trend indicating a change in flow dimension or transition to a zone of lower transmissivity. For the analysis of both phases a radial composite flow model was chosen. The analysis is presented in Appendix 2-38.

Selected representative parameters

The recommended transmissivity of $2.5E-7 \text{ m}^2/\text{s}$ was derived from the analysis of the CHir phase, which shows the best data and derivative quality. It should be noted that the results are uncertain due to the uncertainties concerning the flow dimension. The confidence range for the interval transmissivity is estimated to be 7.0E-8 to $5.0E-7 \text{ m}^2/\text{s}$. The analysis was conducted assuming a flow dimension of 2 for the inner zone and a flow dimension of 1 for the outer zone. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 6,675.0 kPa.

The analysis of the CHi and CHir phases shows some uncertainties concerning the flow dimension that should be resolved in case further analysis of the test is planned. In this case we recommend conducting a full superposition transient analysis in order to account for pressure history effects and changing flow rates during the CHi phase.

6.2.30 Section 685.79–705.79 m, test no 1, pulse injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 214 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. One minute after open the shut-in tool, the flow rate decreased below the measurement limit, indicating a very low interval transmissivity. The pressure in the section stayed stable. The duration of the recovery was extended to 75 minutes and was analysed as a pulse injection phase (Pi).

During the injection phase a total volume of 0.0074 L was injected (derived from the flowmeter measurements. This injected volume produced a pressure increase of 214.1 kPa. Using a dV/dP approach, the wellbore storage coefficient relevant for the subsequent pressure recovery can be calculated to 3.4E-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.

The flow dimension is interpreted from the slope of the semi-log derivative plotted in loglog coordinates. In case of the present test the flow dimension cannot be determined with any degree of certainty because the shape of the deconvolved pulse data is very sensitive to the assumed p0 and pi values of the test. The analysis was conducted assuming a flow dimension of 2 (radial flow). The analysis is presented in Appendix 2-39.

Selected representative parameters

The recommended transmissivity of $1.8E-10 \text{ m}^2/\text{s}$ was derived from the analysis of the CHIR phase. Considering the inherent uncertainties related to the measurement (e.g. specially the measurement of the wellbore storage coefficient) and to the analysis process, the confidence range for the transmissivity is estimated to be 9E-11 to $6E-10 \text{ m}^2/\text{s}$ It should be noted that due to the very low interval transmissivity the results are very uncertain. The analysis was conducted using a flow dimension of 2. No static pressure could be derived.

6.2.31 Section 805.98-825.98 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 90Pa in 30 minutes. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than $1E-11 \text{ m}^2/\text{s}$). None of the test phases is analysable.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow model cannot be determined. No analysis was performed. The measured data is presented in Appendix 2-40.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is lower than $1E-11 \text{ m}^2/\text{s}$.

No further analysis recommended.

6.2.32 Section 826.02-846.02 m, test no 1, injection

Comments to test

The intention was to conduct the test as a constant pressure injection test phase (CHi), followed by a pressure recovery phase (CHir). However, after a few seconds of injection the rate quickly dropped to zero, indicating a very tight section. It was therefore decided to close the test valve and measure the pressure recovery. The test valve was closed, but the pressure kept rising. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than $1E-11 \text{ m}^2/\text{s}$). None of the test phases is analysable.

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow model cannot be determined. No analysis was performed. The measured data is presented in Appendix 2-41.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is lower than $1E-11 \text{ m}^2/\text{s}$.

No further analysis recommended.

6.2.33 Section 846.05-866.05 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 48 kPa in 30 minutes. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than $1E-11 \text{ m}^2/\text{s}$). The test shows no hydraulic communication between the test interval and the adjacent zones. None of the test phases is analysable.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow model cannot be determined. No analysis was performed. The measured data is presented in Appendix 2-42.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is lower than $1E-11 \text{ m}^2/\text{s}$.

No further analysis recommended.

6.2.34 Section 866.08-886.08 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 181 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate control during the CHi phase was not very good. In addition, due to the small injection rates the rate measurements are relatively noisy. The injection rate decreased from 68.4 mL/min at start of the CHi phase to 44.0 mL/min at the end, indicating a relatively low interval transmissivity. The CHir phase shows very fast recovery, such that the analysis does not provide reliable results. The results should be regarded as order of magnitude only.

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the data quality does not allow for a specific determination of the flow dimension. The analysis was conducted assuming a flow dimension of 2 (radial flow). An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-43.

Selected representative parameters

The recommended transmissivity of $3.5E-8 \text{ m}^2/\text{s}$ was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 8.0E-9 to $6.0E-8 \text{ m}^2/\text{s}$. The analysis was conducted using a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 8,646.0 kPa.

The analysis of the CHi and CHir phases shows some inconsistencies, essentially caused by the fast recovery of the CHir phase and the very noisy data of the Chi phase. No further analysis is recommended.

6.2.35 Section 886.11-906.11 m, tests no 1 and 2, injection

Comments to test

The first test conducted in this section was repeated due to a leackage in the pipe string. The Cartesian plots of both tests are shown in the appendix. Only the second test was analysed

The test was composed of a constant pressure injection test phase with a pressure difference of 225 kPa, followed by a pressure recovery phase. The test was accomplished without using the automatic regulation system. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate control during the CHi phase was not very good. In addition, due to the small injection rates (low transmissivity) the rate measurements are relatively noisy. The injection rate decreased from 27.6 mL/min at start of the CHi phase to 17.6 mL/min at the end, indicating a relatively low interval transmissivity. The recovery phase (CHir) shows no IARF, and as such, the results should be regarded as order of magnitude only.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). The data of the CHir phase does not allow for a specific determination of the flow dimension. For the analysis of both phases a radial composite flow model was chosen. The analysis is presented in Appendix 2-44.

Selected representative parameters

The recommended transmissivity of $1.6E-8 \text{ m}^2/\text{s}$ was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 7.0E-9 to $4.0E-8 \text{ m}^2/\text{s}$. 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 8,839.4 kPa.

The analysis of the CHi and CHir phases shows some minor inconsistencies, caused by the small flow rate. No further analysis is recommended.

6.2.36 Section 906.16-926.16 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. The pressure in the bottom zone increased during the injection by 40 kPa, indicating a major connection to the interval. The injection rate decreased from 0.56 L/min at start of the CHi phase to 0.39 L/min at the end, indicating a moderate interval transmissivity. Both phases are adequate for quantitative analysis, but due to the crossflow it should be noted that the results are uncertain.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). The CHir phase derivative shows a downward trend at late times indicating an increase of transmissivity at some distance from the borehole. An infinite acting homogeneous radial flow model was chosen for the analysis of the Chi phase. For the analysis of the CHir phase a radial composite flow model was chosen. The analysis is presented in Appendix 2-45.

Selected representative parameters

The recommended transmissivity of $2.9E-7 \text{ m}^2/\text{s}$ was derived from the analysis of the CHi phase, which shows the best data and derivative quality. Considering the uncertainties due to the connection to the lower zone, the confidence range for the interval transmissivity is estimated to be 5.0E-8 to $4.0E-7 \text{ m}^2/\text{s}$. 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 9,036.0 kPa.

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

6.2.37 Section 926.18–946.18 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed, but there is a connection to the section above (see test no 53). Due to that the results of this analysis are uncertain. The injection rate decreased from 0.59 L/min at start of the CHi phase to 0.40 L/min at the end, indicating a moderate interval transmissivity. The recovery phases show no problems and are adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase and the CHir phase show a

flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-46.

Selected representative parameters

The recommended transmissivity of $2.4E-7 \text{ m}^2/\text{s}$ was derived from the analysis of the CHir phase, which shows the best data and derivative quality. Considering the uncertainties due to the connection to the section above, the confidence range for the interval transmissivity is estimated to be 5.0E-8 to $4.0E-7 \text{ m}^2/\text{s}$. 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 9,233.3 kPa.

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

6.2.38 Section 943.05-963.05 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 202 kPa, followed by a pressure recovery phase. The test was accomplished without using the automatic regulation system. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 24.4 mL/min at start of the CHi phase to 15.7 mL/min at the end, indicating a relatively low interval transmissivity. The recovery phase (CHir) shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test both phases show a flat derivative at middle times (radial flow), and an upward trend at late times indicating a decrease of transmissivity at some distance from the borehole. For the analysis of the two phases a radial composite flow model was chosen. The analysis is presented in Appendix 2-47.

Selected representative parameters

The recommended transmissivity of $2.7E-7 \text{ m}^2/\text{s}$ was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 9.0E-8 to $4.0E-7 \text{ m}^2/\text{s}$. 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 9,395.9 kPa.

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

6.2.39 Section 963.05–983.05 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 160 kPa, followed by a pressure recovery phase. A little connection between test interval and the bottom zone was observed. The injection rate control during the CHi phase was

not very good, however, the data are adequate for quantitative analysis. The injection rate decreased from 0.18 L/min at start of the CHi phase to 0.11 L/min at the end, indicating a relatively moderate interval transmissivity. The recovery phase (CHir) shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). The data of the CHir phase do not allow for a specific determination of the flow dimension. A flow dimension of 2 was assumed. An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-48.

Selected representative parameters

The recommended transmissivity of $8.2E-8 \text{ m}^2/\text{s}$ was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 5.0E-8 to $2.0E-7 \text{ m}^2/\text{s}$. 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 9,586.7 kPa.

The analysis of the CHi and CHir phases shows some inconsistency that should be resolved in case further analysis of the test is planned. In this case we recommend conducting a full superposition transient analysis in order to account for pressure history effects and changing flow rates during the CHi phase.

6.3 5 m single-hole injection tests

In the following, the 5 m section tests conducted in borehole KLX04 are presented and analysed.

6.3.1 Section 300.41–305.41 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 160 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. After 13 minutes of the injection phase, the flow dropped relatively sharp from 70.3 mL to 67.4 mL and the pressure dropped from that moment to the end of the Chi phase by 7 kPa. The reason for that drop is unknown. Due to that, only the first part of the Chi phase was analysed. The CHir phase shows very fast recovery, such that the analysis does not provide reliable results. The results should be regarded as order of magnitude only.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the data quality does not allow for a specific determination of the flow dimension. The analysis was conducted assuming a flow

dimension of 2 (radial flow). For the analysis of both phases an infinite acting radial flow model was chosen. The analysis is presented in Appendix 2-49.

Selected representative parameters

The recommended transmissivity of $9.1E-8 \text{ m}^2/\text{s}$ was derived from the analysis of the CHi phase, which shows the best data and derivative quality. It should be noted, that due to the above mentioned drop in flow, the results are very uncertain. The confidence range for the interval transmissivity is estimated to be 3.0E-8 to $2.0E-7 \text{ m}^2/\text{s}$. The analysis was conducted using a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 2,968.2 kPa.

The analysis of the CHi and CHir phases shows some inconsistencies, essentially caused by the drop in flow and the fast recovery.

6.3.2 Section 305.41-310.41 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 60 kPa in 30 minutes. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than $1E-11 \text{ m}^2/\text{s}$). The test shows no hydraulic communication between the test interval and the adjacent zones. None of the test phases is analysable.

Flow regime and calculated parameters

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

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is lower than $1E-11 \text{ m}^2/\text{s}$.

No further analysis recommended.

6.3.3 Section 310.42–315.42 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 220 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. Due to the time needed by the system to get stable pressure conditions, the first part of the Chi phase is not analysable. The injection rate decreased from 0.41 L/min at start of the CHi phase to 0.30 L/min at the end, indicating a relatively low interval transmissivity. The CHir phase shows very fast recovery, such that the analysis does not provide reliable results. The results should be regarded as order of magnitude only.

The flow dimension is interpreted from the slope of the semi-log derivative plotted in loglog coordinates. In case of the present test the CHi phase shows a flat derivative at middle times, which is indicative of a flow dimension of 2 (radial flow). At late times it shows an upward trend indicating a decrease of transmissivity at some distance from the borehole or a change to a flow dimension of about 1. The CHir phase derivative is flat at late times, indicating aflow dimension of 2. A two shell composite flow model was chosen for the analysis of the Chi phase. For the analysis of the CHir phase an infinite acting radial flow model with wellbore storage and skin was chosen. The analysis is presented in Appendix 2-51.

Selected representative parameters

The recommended transmissivity of $4.6E-7 \text{ m}^2/\text{s}$ was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 1.0E-7 to $8.0E-7 \text{ m}^2/\text{s}$. 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 3,063.3 kPa.

The analysis of the CHi and CHir phases shows some inconsistency that should be resolved in case further analysis of the test is planned. In this case we recommend conducting a full superposition transient analysis in order to account for pressure history effects and changing flow rates during the CHi phase.

6.3.4 Section 315.43–320.43 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 0.38 L/min at start of the CHi phase to 0.32 L/min at the end, indicating a relatively moderate interval transmissivity. After 7 minutes a remarkable decrease of flow rate was observed. Only the first part of the Chi phase is analysable. The CHir phase shows very fast recovery, such that the analysis does not provide reliable results. The results should be regarded as order of magnitude only.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in loglog coordinates. In case of the present test the CHi phase shows a flat derivative at middle times, which is indicative of a flow dimension of 2 (radial flow). The CHir phase derivative is flat at late times. An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-52.

Selected representative parameters

The recommended transmissivity of $7.2E-7 \text{ m}^2/\text{s}$ was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 2.0E-7 to $9.0E-7 \text{ m}^2/\text{s}$. 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 3,113.1 kPa.

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

6.3.5 Section 320.43–325.43 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 213 kPa, followed by a pressure recovery phase. The test was accomplished without using the automatic regulation system. The pressure in the section decreased during the injection phase by 10 kPa. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 32.2 mL/min at start of the CHi phase to 15.4 mL/min at the end, indicating a relatively low interval transmissivity. After about 13 minutes of the Chi phase, the flow rate rose for about three minutes to decrease again after that. The reason for this is unknown and due to that this part of this Chi phase is not analysable. The CHir phase shows very fast recovery, such that the analysis does not provide reliable results. The results should be regarded as order of magnitude only.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the data quality does not allow for a specific determination of the flow dimension. The analysis was conducted assuming a flow dimension of 2 (radial flow). A radial two shell composite model was for the analysis of the CHi phase. For the analysis of the CHi phase an infinite acting radial flow model was chosen. The analysis is presented in Appendix 2-53.

Selected representative parameters

The recommended transmissivity of $1.4E-8 \text{ m}^2/\text{s}$ was derived from the analysis of the CHi phase. The confidence range for the interval transmissivity is estimated to be 6.0E-9 to $4.0E-8 \text{ m}^2/\text{s}$. The analysis was conducted using a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,161.4 kPa.

The analysis of the CHi and CHir phases shows some inconsistencies, mainly caused by the noisy data of the Chi phase and the fast recovery of the CHir phase.

6.3.6 Section 325.44–330.44 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 208 kPa, followed by a pressure recovery phase. The test was accomplished without using the automatic regulation system. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 71.5 mL/min at start of the CHi phase to 65.8 mL/min at the end, indicating a relatively low interval transmissivity. The CHir phase shows very fast recovery, such that the analysis does not provide reliable results. The results should be regarded as order of magnitude only.

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase and the CHir phase show a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). For the analysis of the CHi phase a radial composite flow model was chosen. An infinite acting homogeneous radial flow model with wellbore storage and skin was chosen for the analysis of the CHir phase. The analysis is presented in Appendix 2-54.

Selected representative parameters

The recommended transmissivity of $2.3E-7 \text{ m}^2/\text{s}$ was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 8.0E-8 to $5.0E-7 \text{ m}^2/\text{s}$. 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 3,210.4 kPa.

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

6.3.7 Section 330.44–335.44 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 215 kPa, followed by a pressure recovery phase. The test was accomplished without using the automatic regulation system. No hydraulic connection between test interval and the adjacent zones was observed. Due to the small injection rates the rate measurements are relatively noisy. The injection rate decreased from 11.0 mL/min at start of the CHi phase to 1.60 mL/min at the end, indicating a low interval transmissivity. The recovery phase (CHir) did not reach IARF, however, the data is of good quality and as such, amenable for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows an upward slope during the entire time, which is indicative of a flow dimension of 1 (linear flow). The CHir phase does not allow for a specific determination of the flow dimension. The analysis was conducted assuming a flow dimension of 2 (radial flow). An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-55.

Selected representative parameters

The recommended transmissivity of $1.3E-8 \text{ m}^2/\text{s}$ was derived from the analysis of the CHir phase, which shows the best data and derivative quality. Concerning the uncertainties due to the low flow rate, the confidence range for the interval transmissivity is estimated to be 3.0E-9 to $4.0E-8 \text{ m}^2/\text{s}$. The test data allow not allow for a specific determination of the flow dimension. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,258.0 kPa.

The analysis of the CHi and CHir phases shows some inconsistencies, this being mainly caused by the very low interval transmissivity and the test design which was not optimized for this transmissivity range. No further analysis is recommended.

6.3.8 Section 335.44–340.44 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. The test was accomplished without using the automatic regulation system. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 0.21 L/min at start of the CHi phase to 0.14 L/min at the end, indicating a moderate interval transmissivity. The CHir phase shows very fast recovery, such that this phase is not analysable.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). An infinite acting homogeneous radial flow model was chosen for the analysis of the CHi phase. The analysis is presented in Appendix 2-56.

Selected representative parameters

The recommended transmissivity of $8.5E-8 \text{ m}^2/\text{s}$ was derived from the analysis of the CHi phase. The confidence range for the interval transmissivity is estimated to be 5.0E-8 to $3.0E-7 \text{ m}^2/\text{s}$. The flow dimension displayed during the test is 2. Static pressure measured at the end of the recovery is 3,309.9 kPa. The CHir phase shows very fast recovery, such that this phase is not analysable.

No further analysis is recommended.

6.3.9 Section 340.44–345.44 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. The test was accomplished without using the automatic regulation system. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 53.9 mL/min at start of the CHi phase to 36.9 mL/min at the end, indicating a relatively low interval transmissivity. The CHir phase shows very fast recovery, such that the analysis does not provide reliable results. The results should be regarded as order of magnitude only.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase and the CHir phase show a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-57.

Selected representative parameters

The recommended transmissivity of $3.2E-8 \text{ m}^2/\text{s}$ was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 1.0E-8 to $6.0E-8 \text{ m}^2/\text{s}$. 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 3,360.4 kPa.

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

6.3.10 Section 345.44–350.44 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. It takes about 9 minutes to get stable pressure conditions. Due to that, only the second part of the Chi phase was analysed. The injection rate decreased from 0.30 L/min at start of the CHi phase to 0.18 L/min at the end, indicating a relatively moderate interval transmissivity. The CHir phase shows very fast recovery. This phase is not analysable.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). An infinite acting homogeneous radial flow model was chosen for the analysis of the Chi phase. The analysis is presented in Appendix 2-58.

Selected representative parameters

The recommended transmissivity of $1.1E-7 \text{ m}^2/\text{s}$ was derived from the analysis of the CHi phase. The confidence range for the interval transmissivity is estimated to be 7.0E-8 to $4.0E-7 \text{ m}^2/\text{s}$. The flow dimension displayed during the test is 2. The static pressure measured at the end of the recovery is 3,408.1 kPa.

No further analysis is recommended.

6.3.11 Section 350.45-355.45 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. The pressure in the bottom zone increased during the injection phase by 2 kPa, indicating a little connection to that section. The first part of the CHi phase is not analysable due to the time needed to regulate constant pressure. However, the second part of the CHi phase can be analysed quantitatively. The injection rate decreased from 10.01 L/min at start of the CHi phase to 7.74 L/min at the end, indicating a high interval transmissivity. 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 and the CHir phase show a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-59.

Selected representative parameters

The recommended transmissivity of $1.5E-5 \text{ m}^2/\text{s}$ was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 6.0E-6 to $4.0E-5 \text{ m}^2/\text{s}$. 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 3,457.1 kPa.

The analysis of the CHi and CHir phases shows some inconsistency that should be resolved in case further analysis of the test is planned. In this case we recommend conducting a full superposition transient analysis in order to account for pressure history effects and changing flow rates during the CHi phase.

6.3.12 Section 355.47-360.47 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 1.21 L/min at start of the CHi phase to 1.17 L/min at the end, indicating a relatively high interval transmissivity. The recovery phase (CHir) shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase and the CHir phase show a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). For the analysis of the CHi phase a radial composite flow model was chosen. An infinite acting homogeneous radial flow model with wellbore storage and skin was chosen for the analysis of the CHir phase. The analysis is presented in Appendix 2-60.

Selected representative parameters

The recommended transmissivity of $9.1E-6 \text{ m}^2/\text{s}$ was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 1.0E-6 to $1.0E-7 \text{ m}^2/\text{s}$. 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 3,506.4 kPa.

The analysis of the CHi and CHir phases shows some inconsistencies that should be resolved in case further analysis of the test is planned. In this case we recommend conducting a full superposition transient analysis in order to account for pressure history effects and changing flow rates during the CHi phase.

6.3.13 Section 360.47-365.47 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 195 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate control during the CHi phase was good. The injection rate decreased from 0.52 L/min at start of the CHi phase to 0.43 L/min at the end, indicating a moderate interval transmissivity. The CHir phase shows relatively fast recovery, however, the data is of good quality and as such, amenable for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase and the CHir phase show a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-61.

Selected representative parameters

The recommended transmissivity of $9.2E-7 \text{ m}^2/\text{s}$ was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 5.0E-7 to $2.0E-6 \text{ m}^2/\text{s}$. 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 3,553.3 kPa.

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

6.3.14 Section 365.47-370.47 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. Due to the time needed to regulate constant pressure, the first part of the CHir phase is not analysable. The injection rate decreased from 22.5 mL/min at start of the CHi phase to 10.6 mL/min at the end, indicating a relatively low interval transmissivity. The CHir phase shows relatively fast recovery, however, the data is amenable for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase data does not allow a specific etermination of the flow dimension. The analysis was conducted assuming a flow dimension of 2 (radial flow). The CHir phase derivative is flat at late times, indicating radial flow. For the analysis of the CHi phase a radial composite flow model was chosen. An infinite acting homogeneous radial flow model was chosen for the analysis of the CHir phase. The analysis is presented in Appendix 2-62.
Selected representative parameters

The recommended transmissivity of $3.3E-9 \text{ m}^2/\text{s}$ was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The early time response of the CHi phase was regarded as skin, which is consistent with the CHir response. Due to the poor data quality, the confidence range for the interval transmissivity is estimated to be 2.0E-9 to $4.0E-8 \text{ m}^2/\text{s}$. The analysis was conducted using a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,599.9 kPa.

The analysis of the CHi and CHir phases shows some inconsistencies, caused by the poor data quylity. No further analysis is recommended.

6.3.15 Section 370.47-375.47 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 195 kPa, followed by a pressure recovery phase. The pressure in the section decreased during the injection phase by 16 kPa. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 101 mL/min at start of the CHi phase to 64.2 mL/min at the end, indicating a relatively low interval transmissivity. The CHir phase shows very fast recovery, such that the analysis does not provide reliable results. The results should be regarded as order of magnitude only.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). The data the CHir phase does not allow for a specific determination of the flow dimension. This phase was analysed assuming a flow dimension of 2. An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-63.

Selected representative parameters

The recommended transmissivity of $5.2E-8 \text{ m}^2/\text{s}$ was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 3.0E-8 to $9.0E-8 \text{ m}^2/\text{s}$. 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 3,647.1 kPa.

The analysis of the CHi and CHir phases shows some inconsistencies, essentially caused by the fast recovery of the CHir phase and from this resulting data quality of this phase.

6.3.16 Section 375.47-380.47 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 188 kPa, followed by a pressure recovery phase. The test was accomplished without using the automatic regulation system. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 0.53 L/min at start of

the CHi phase to 0.32 L/min at the end, indicating a moderate interval transmissivity. The CHir phase shows very fast recovery, such that the analysis does not provide reliable results. The results should be regarded as order of magnitude only.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase and the CHir phase show a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-64.

Selected representative parameters

The recommended transmissivity of $2.3E-7 \text{ m}^2/\text{s}$ was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 9.0E-8 to $4.0E-7 \text{ m}^2/\text{s}$. 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 3,693.3 kPa.

The analysis of the CHi and CHir phases shows some inconsistency, essentially caused by the fast recovery of the CHir phase and from this resulting data quality of this phase.

6.3.17 Section 380.47-385.47 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 205 kPa, followed by a pressure recovery phase. The test was accomplished without using the automatic regulation system. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate control during the CHi phase was not very good. In addition, due to the small injection rates (low transmissivity) the rate measurements are relatively noisy. The injection rate decreased from 29.0 mL/min at start of the CHi phase to 19.6 mL/min at the end, indicating a relatively low interval transmissivity. The recovery phase (CHir) shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). The data of the CHir phase does not allow for a specific determination of the flow dimension. It was analysed assuming a flow dimension of 2. An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-65.

Selected representative parameters

The recommended transmissivity of $2.1E-8 \text{ m}^2/\text{s}$ was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 9.0E-9 to $4.0E-8 \text{ m}^2/\text{s}$. 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 3,744.8 kPa.

The analysis of the CHi and CHir phases shows some inconsistencies, mainly caused of the fact, that no infinite acting radial flow was measured during the CHir phase. No further analysis is recommended.

6.3.18 Section 385.47-390.47 m, test no 1, pulse injection

Comments to test

The test was initiated as a constant pressure injection. However, after a few seconds of injection the rate quickly dropped to zero, indicating a very tight section. It was therefore decided to close the test valve and measure the pressure recovery. The pressure recovery was analysed as a pulse injection phase (Pi). No hydraulic connection between the test interval and the adjacent sections was observed.

During the brief injection phase a total volume of 1.72 mL was injected (derived from the flowmeter measurements. This injected volume produced a pressure increase of 200.9 kPa. Using a dV/dP approach, the wellbore storage coefficient relevant for the subsequent pressure recovery can be calculated to $8.5E-12 \text{ m}^3$ /Pa. It should be noted though that there is large uncertainty connected with the determination of the wellbore storage coefficient (probably one order of magnitude), which will implicitly translate into uncertainty in the derived transmissivity.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in loglog coordinates. In case of the present test the flow dimension cannot be determined with any degree of certainty. The test was analysed assuming a flow dimension of 2 (radial flow) and using a two shell radial composite flow model. Additionally the analysis was conducted using a flow dimension of 3 (spherical flow) and an infinite acting homogeneous flow model. The analysis is presented in Appendix 2-66.

Selected representative parameters

The recommended transmissivity of $8.3E-12 \text{ m}^2/\text{s}$ was derived from the analysis of the PI phase, assuming a flow dimension of 2. Considering the inherent uncertainties related to the measurement (e.g. specially the measurement of the wellbore storage coefficient) and to the analysis process (e.g. numeric distortion when calculating the derivative and pressure history effects), the confidence range for the transmissivity is estimated to be 7E-12 to $5E-11 \text{ m}^2/\text{s}$. No static pressure could be derived.

The transmissivity derived from the alternative analysis assuming a flow dimension of 3 is $1.0E-12 \text{ m}^2/\text{s}$.

No further analysis is recommended.

6.3.19 Section 390.48-395.48 m, test no 1, pulse injection

Comments to test

The test was initiated as a constant pressure injection. However, after a few seconds of injection the rate quickly dropped to zero, indicating a very tight section. It was therefore decided to close the test valve and measure the pressure recovery. The pressure recovery was analysed as a pulse injection phase (PI). No hydraulic connection between the test interval and the adjacent sections was observed.

During the brief injection phase a total volume of 0.004 L was injected (derived from the flowmeter measurements. This injected volume produced a pressure increase of 204.0 kPa. Using a dV/dP approach, the wellbore storage coefficient relevant for the subsequent pressure recovery can be calculated to 2.0E-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.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in loglog coordinates. In case of the present test the flow dimension cannot be determined with any degree of certainty. The test was analysed assuming a flow dimension of 2 (radial flow) and using a two shell radial composite flow model. Additionally the analysis was conducted using a flow dimension of 3 (spherical flow) and an infinite acting homogeneous flow model. The analysis is presented in Appendix 2-67.

Selected representative parameters

The recommended transmissivity of $8.7E-11 \text{ m}^2/\text{s}$ was derived from the analysis of the PI phase assuming a flow dimension of 2. Considering the inherent uncertainties related to the measurement (e.g. specially the measurement of the wellbore storage coefficient) and to the analysis process (e.g. numeric distortion when calculating the derivative and pressure history effects), the confidence range for the transmissivity is estimated to be 7E-11 to $4E-10 \text{ m}^2/\text{s}$. No static pressure could be derived.

The transmissivity derived from the alternative analysis assuming a flow dimension of 3 is $1.0E-11 \text{ m}^2/\text{s}$.

No further analysis is recommended.

6.3.20 Section 395.48–400.48 m, test no 1, pulse injection

Comments to test

The test was initiated as a constant pressure injection. However, after a few seconds of injection the rate quickly dropped to zero, indicating a very tight section. It was therefore decided to close the test valve and measure the pressure recovery. No hydraulic connection between the test interval and the adjacent sections was observed.

Flow regime and calculated parameters

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

Selected representative parameters

Based on the measured test data, the interval transmissivity is lower than $1E-10 \text{ m}^2/\text{s}$.

No further analysis recommended.

6.3.21 Section 400.48-405.48 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 214 kPa, followed by a pressure recovery phase. The test was accomplished without using the automatic regulation system. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 41.6 mL/min at start of the CHi phase to 22.1 mL/min at the end, indicating a relatively low interval transmissivity. The CHir phase shows very fast recovery, such that the analysis does not provide reliable results. The results should be regarded as order of magnitude only.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the data quality does not allow for a specific determination of the flow dimension. The analysis was conducted assuming a flow dimension of 2 (radial flow). An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-69.

Selected representative parameters

The recommended transmissivity of $1.5E-8 \text{ m}^2/\text{s}$ was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 7.0E-9 to $4.0E-8 \text{ m}^2/\text{s}$. The analysis was conducted using a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,943.5 kPa.

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

6.3.22 Section 405.49-410.49 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 216 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. Due to the small injection rates (low transmissivity) the rate measurements are relatively noisy. The injection rate decreased from 21.0 mL/min at start of the CHi phase to 10.2 mL/min at the end, indicating a relatively low interval transmissivity. The CHir phase shows very fast recovery, such that the analysis does not provide reliable results. The results should be regarded as order of magnitude only.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the data quality does not allow for a specific determination of the flow dimension. The analysis was conducted assuming a flow dimension of 2 (radial flow). For the analysis of the CHi phase a radial composite flow model was chosen. An infinite acting homogeneous radial flow model was chosen for the analysis of the CHi phase. The analysis is presented in Appendix 2-70.

Selected representative parameters

The recommended transmissivity of $6.7E-9 \text{ m}^2/\text{s}$ was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 2.0E-9 to $8.0E-9 \text{ m}^2/\text{s}$. The analysis was conducted using a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3,991.4 kPa.

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

6.3.23 Section 410.50-415.50 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 215 kPa, followed by a pressure recovery phase. The test was accomplished without using the automatic regulation system. No hydraulic connection between test interval and the adjacent zones was observed. Due to the very small injection rates the rate measurements are relatively noisy. The injection rate decreased from 3.7 mL/min at start of the CHi phase to 1.7 mL/min at the end, indicating a very low interval transmissivity. The recovery phase (CHir) shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the data quality does not allow for a specific determination of the flow dimension. The analysis was conducted assuming a flow dimension of 2 (radial flow). An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-71.

Selected representative parameters

The recommended transmissivity of $9.3E-10 \text{ m}^2/\text{s}$ was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 8.0E-10 to $3.0E-9 \text{ m}^2/\text{s}$. The analysis was conducted using a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 4,036.9 kPa.

The analysis of the CHi and CHir phases shows some inconsistencies, mainly caused by the fact, that IARF was not measured during the CHir phase and as such, the results of this phase are uncertain. No further analysis is recommended.

6.3.24 Section 415.51-420.51 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. Due to the time needed by the system to regulate stable pressure, the first part of the Chi phase is not analysable. The injection rate

decreased from 0.50 L/min at start of the CHi phase to 0.44 L/min at the end, indicating a relatively moderate interval transmissivity. The CHir phase shows relatively fast recovery, however, the data is of good quality and as such, amenable for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the data quality of the CHi phase does not allow for a specific determination of the flow dimension. This phase was analysed assuming a flow dimension of 2 (radial flow) and a two shell composite flow model was chosen for this analysis. In addition, an alternative analysis of this phase was conducted assuming a flow dimension of 3 (spherical flow) and using an infinite acting homogeneous radial flow model. The CHir phase derivative is flat at late times, indicating a flow dimension of 2. For the analysis an infinite acting homogeneous radial flow model was chosen. The analysis is presented in Appendix 2-72.

Selected representative parameters

The recommended transmissivity of $2.4E-6 \text{ m}^2/\text{s}$ was derived from the analysis of the CHir phase, which shows the best data and derivative quality. It should be noted that due to the above mentioned uncertainties regarding the flow dimension, the results are uncertain. The confidence range for the interval transmissivity is estimated to be 7.0E-7 to $5.0E-6 \text{ m}^2/\text{s}$. The analysis was conducted using a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 4,087.5 kPa.

The transmissivity derived from the alternative analysis assuming a flow dimension of 3 is $2.9E-8 \text{ m}^2/\text{s}$.

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

6.3.25 Section 420.51-425.51 m, test no 1, pulse injection

Comments to test

The test was initiated as a constant pressure injection. However, after a few seconds of injection the rate quickly dropped to zero, indicating a very tight section. It was therefore decided to close the test valve and measure the pressure recovery. The pressure recovery was analysed as a pulse injection phase (PI). No hydraulic connection between the test interval and the adjacent sections was observed.

During the brief injection phase a total volume of 1.24 mL was injected (derived from the flowmeter measurements. This injected volume produced a pressure increase of 198.1 kPa. Using a dV/dP approach, the wellbore storage coefficient relevant for the subsequent pressure recovery can be calculated to $6.3E-12 \text{ m}^3$ /Pa. It should be noted though that there is large uncertainty connected with the determination of the wellbore storage coefficient (probably one order of magnitude), which will implicitly translate into uncertainty in the derived transmissivity.

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow dimension cannot be determined with any degree of certainty. The derivative shows a downward trend at late times, which is indicative for a transition to a zone of higher transmissivity in some distance of the borehole or for a flow dimension of 3. The test was analysed assuming a flow dimension of 2 (radial flow) and using a two shell radial composite flow model. The analysis is presented in Appendix 2-73.

Selected representative parameters

The recommended transmissivity of $7.9E-11 \text{ m}^2/\text{s}$ was derived from the analysis of the CHir phase assuming a flow dimension of 2. Considering the inherent uncertainties related to the measurement (e.g. specially the measurement of the wellbore storage coefficient) and to the analysis process (e.g. numeric distortion when calculating the derivative and pressure history effects), the confidence range for the transmissivity is estimated to be 5E-11 to 3E-10 No further analysis is recommended.

6.3.26 Section 425.51–430.51 m, test no 1, pulse injection

Comments to test

The test was initiated as a constant pressure injection. However, after a few seconds of injection the rate quickly dropped to zero, indicating a very tight section. It was therefore decided to close the test valve and measure the pressure recovery. The pressure recovery was analysed as a pulse injection phase (PI). No hydraulic connection between the test interval and the adjacent sections was observed.

During the brief injection phase a total volume of 1.58 mL was injected (derived from the flowmeter measurements. This injected volume produced a pressure increase of 200.0 kPa. Using a dV/dP approach, the wellbore storage coefficient relevant for the subsequent pressure recovery can be calculated to $7.9E-13 \text{ m}^3/Pa$. It should be noted though that there is large uncertainty connected with the determination of the wellbore storage coefficient (probably one order of magnitude), which will implicitly translate into uncertainty in the derived transmissivity.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in loglog coordinates. In case of the present test the flow dimension cannot be determined with any degree of certainty. The test was analysed assuming a flow dimension of 2 (radial flow) and using a two shell radial composite flow model. Additionally the analysis was conducted using a flow dimension of 3 (spherical flow) and an infinite acting homogeneous flow model. The analysis is presented in Appendix 2-74.

Selected representative parameters

The recommended transmissivity of $1.2E-11 \text{ m}^2/\text{s}$ was derived from the analysis of the PI phase assuming a flow dimension of 2. Considering the inherent uncertainties related to the measurement (e.g. specially the measurement of the wellbore storage coefficient) and to the analysis process (e.g. numeric distortion when calculating the derivative and pressure history effects), the confidence range for the transmissivity is estimated to be 8E-12 to 7E-11 m²/s. No static pressure could be derived.

The transmissivity derived from the alternative analysis assuming a flow dimension of 3 is $1.4E-12 \text{ m}^2/\text{s}$.

No further analysis is recommended.

6.3.27 Section 430.51-435.51 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 212 kPa, followed by a pressure recovery phase. The test was accomplished without using the automatic regulation system. No hydraulic connection between test interval and the adjacent zones was observed. Due to the small injection rates the rate measurements are relatively noisy and the results of the analysis of the Chi phase should be regarded as order of magnitude only. The injection rate stayed during the entire injection phase relative stable at about 4.3 mL, indicating a very low interval transmissivity. The recovery phase (CHir) shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow dimension cannot be clearly derived from one of the phases. An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-75.

Selected representative parameters

The recommended transmissivity of $1.2E-8 \text{ m}^2/\text{s}$ was derived from the analysis of the CHir phase, which shows the best data and derivative quality. Considering the low interval transmissivity the confidence range for the interval transmissivity is estimated to be 5.0E-9 to $3.0E-8 \text{ m}^2/\text{s}$. The analysis was conducted using a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 4,239.7 kPa.

The analysis of the CHi and CHir phases shows some inconsistencies, mainly caused by the poor data quality of the Chi phase. No further analysis is recommended.

6.3.28 Section 435.50-440.50 m, test no 1, injection

Comments to test

The intention was to conduct the test as a constant pressure injection test phase (CHi), followed by a pressure recovery phase (CHir). However, after inflating the packers and closing the test valve, the pressure kept rising by 26 kPa in 30 minutes. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than 1E–11 m²/s). The test shows no hydraulic communication between the test interval and the adjacent zones. None of the test phases is analysable.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow model cannot be determined. No analysis was performed. The measured data is presented in Appendix 2-76.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is lower than $1E-11 \text{ m}^2/\text{s}$.

No further analysis recommended.

6.3.29 Section 440.50–445.50 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 94.2 mL/min at start of the CHi phase to 61.2 mL/min at the end, indicating a relatively low interval transmissivity. The recovery phase (CHir) shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase and the CHir phase show a downward trend at late times indicating an increase of transmissivity at some distance from the borehole. For the analysis of both phases a radial composite flow model was chosen. The analysis is presented in Appendix 2-77.

Selected representative parameters

The recommended transmissivity of $4.0E-8 \text{ m}^2/\text{s}$ was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 1.0E-8 to $8.0E-8 \text{ m}^2/\text{s}$. 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 4,333.1 kPa.

The analysis of the CHi and CHir phases shows some inconsistencies that should be resolved in case further analysis of the test is planned. In this case we recommend conducting a full superposition transient analysis in order to account for pressure history effects and changing flow rates during the CHi phase.

6.3.30 Section 445.50-450.50 m, test no 1, pulse injection

Comments to test

The test was initiated as a constant pressure injection. However, after a few seconds of injection the rate quickly dropped to zero, indicating a very tight section. It was therefore decided to close the test valve and measure the pressure recovery. The pressure recovery was analysed as a pulse injection phase (PI). No hydraulic connection between the test interval and the adjacent sections was observed.

During the brief injection phase a total volume of 1.81 mL was injected (derived from the flowmeter measurements. This injected volume produced a pressure increase of 202.5 kPa. Using a dV/dP approach, the wellbore storage coefficient relevant for the subsequent pressure recovery can be calculated to $8.9E-12 \text{ m}^3/Pa$. It should be noted though that there

is large uncertainty connected with the determination of the wellbore storage coefficient (probably one order of magnitude), which will implicitly translate into uncertainty in the derived transmissivity.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the derivative is flat at late times, indicating a flow dimension of 2. There are uncertainties about the flow dimension, because the shape of the deconvolved pulse data is very sensitive to the assumed p* (static pressure) and pi (max pulse pressure) values of the test. The test was analysed assuming a flow dimension of 2 (radial flow) and using a two shell radial composite flow model. The analysis is presented in Appendix 2-78.

Selected representative parameters

The recommended transmissivity of $8.4E-12 \text{ m}^2/\text{s}$ was derived from the analysis of the PI phase assuming a flow dimension of 2. Considering the inherent uncertainties related to the measurement (e.g. specially the measurement of the wellbore storage coefficient) and to the analysis process (e.g. numeric distortion when calculating the derivative and pressure history effects), the confidence range for the transmissivity is estimated to be 1E-12 to $1E-11 \text{ m}^2/\text{s}$. No static pressure could be derived.

No further analysis is recommended.

6.3.31 Section 450.50-455.50 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 209 kPa, followed by a pressure recovery phase. The test was accomplished without using the automatic regulation system. Due to the very small injection rates the rate measurements are very noisy. The injection rate decreased from 4.8 mL/min at start of the CHi phase to 2.3 mL/min at the end, indicating a low interval transmissivity. The recovery phase (CHir) shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow dimension cannot be clearly derived from one of the phases. The analysis was conducted assuming a flow dimension of 2 (radial flow). An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-79.

Selected representative parameters

The recommended transmissivity of $1.6E-9 \text{ m}^2/\text{s}$ was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 8.0E-10 to $4.0E-9 \text{ m}^2/\text{s}$. The analysis was conducted assuming a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 4,410.7 kPa.

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

6.3.32 Section 455.50-460.50 m, test no 1, pulse injection

Comments to test

The test was initiated as a constant pressure injection. However, after three minutes of injection the rate quickly dropped to zero, indicating a very tight section. It was therefore decided to close the test valve and measure the pressure recovery. The pressure recovery was analysed as a pulse injection phase (Pi).

During the brief injection phase a total volume of 9.89 mL was injected (derived from the flowmeter measurements. This injected volume produced a pressure increase of 201.0 kPa. Using a dV/dP approach, the wellbore storage coefficient relevant for the subsequent pressure recovery can be calculated to $4.9E-11 \text{ m}^3$ /Pa. It should be noted though that there is large uncertainty connected with the determination of the wellbore storage coefficient (probably one order of magnitude), which will implicitly translate into uncertainty in the derived transmissivity.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the Pi phase shows a flat derivative at middle times, which is indicative of a flow dimension of 2 (radial flow). At late times it shows a sharp upward trend. The reason is unknown and this part was not analysed. For the analysis a radial composite flow model was chosen. The analysis is presented in Appendix 2-80.

Selected representative parameters

The recommended transmissivity of $1.3E-10 \text{ m}^2/\text{s}$ was derived from the analysis of the Pi phase. It should be noted that due to the very low interval transmissivity the results are very uncertain. Considering the inherent uncertainties related to the measurement (e.g. specially the measurement of the wellbore storage coefficient) and to the analysis process (e.g. numeric distortion when calculating the derivative and pressure history effects), the confidence range for the transmissivity is estimated to be 3E-11 to $3E-10 \text{ m}^2/\text{s}$. The analysis was conducted using a flow dimension of 2. No static pressure could be derived.

6.3.33 Section 460.51–465.51 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 219 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. Due to the small injection rates the rate measurements are noisy and the results of the Chi phase should be regarded as order of magnitude only. The injection rate decreased from 3.1 mL/min at start of the CHi phase to 0.6 mL/min at the end, indicating a low interval transmissivity. The recovery phase (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. In case of the present test the flow dimension cannot be clearly derived from one of the phases. The analysis was conducted using a flow dimension of 2. For the analysis of the CHi phase a radial composite flow model was chosen. An infinite acting homogeneous radial flow model was chosen for the analysis of the CHir phase. The analysis is presented in Appendix 2-81.

Selected representative parameters

The recommended transmissivity of $3.1E-9 \text{ m}^2/\text{s}$ was derived from the analysis of the CHir phase, which shows the best data and derivative quality. Concerning the low interval transmissivity, the confidence range for the interval transmissivity is estimated to be 6.0E-10 to $4.0E-9 \text{ m}^2/\text{s}$. The analysis was conducted using a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 4,529.4 kPa.

The analysis of the CHi and CHir phases shows some inconsistencies, mainly caused by the poor data quality of the Chi phase. No further analysis is recommended.

6.3.34 Section 465.52-470.52 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 220 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 17.5 mL/min at start of the CHi phase to 6.1 mL/min at the end, indicating a relatively low interval transmissivity. The recovery phase (CHir) shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow dimension cannot be clearly derived from one of the phases. A flow dimension of 2 was assumed. For the analysis of the Chi phase a radial composite flow model was chosen. An infinite acting radial flow model was chosen for the for the analysis of the CHir phase. The analysis is presented in Appendix 2-82.

Selected representative parameters

The recommended transmissivity of $6.2E-9 \text{ m}^2/\text{s}$ was derived from the analysis of the CHir phase, which shows the best data and derivative quality. Considering the uncertainties concerning the flow dimension, the confidence range for the interval transmissivity is estimated to be 7.0E-10 to $7.0E-9 \text{ m}^2/\text{s}$. The analysis was conducted assuming a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 4,570.1 kPa.

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

6.3.35 Section 470.52-475.52 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 36 kPa in 30 minutes. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than $1E-11 \text{ m}^2/\text{s}$). The test shows no hydraulic communication between the test interval and the adjacent zones. None of the test phases is analysable.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow model cannot be determined. No analysis was performed. The measured data is presented in Appendix 2-83.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is lower than $1E-11 \text{ m}^2/\text{s}$.

No further analysis recommended.

6.3.36 Section 475.52–480.52 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 37 kPa in 30 minutes. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than $1E-11 \text{ m}^2/\text{s}$). The test shows no hydraulic communication between the test interval and the adjacent zones. None of the test phases is analysable.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow model cannot be determined. No analysis was performed. The measured data is presented in Appendix 2-84.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is lower than $1E-11 \text{ m}^2/\text{s}$.

No further analysis recommended.

6.3.37 Section 480.52-485.52 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 217 kPa, followed by a pressure recovery phase. The test was accomplished without using the automatic regulation system. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 65.6 mL/min at start of the CHi phase to 51.0 mL/min at the end, indicating a relatively low interval transmissivity. The CHir phase shows relatively fast recovery, however, the data is of good quality and as such, amenable for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in loglog coordinates. In case of the present test the CHi phase shows a flat derivative at middle times, which is indicative of a flow dimension of 2 (radial flow). At late times it shows an upward trend, indicating a decrease of transmissivity at some distance from the borehole. The CHir phase shows a flat derivative at late times. For the analysis of the CHi phase a radial composite flow model was chosen. An infinite acting homogeneous radial flow model with wellbore storage and skin was chosen for the analysis of the CHir phase. The analysis is presented in Appendix 2-85.

Selected representative parameters

The recommended transmissivity of $1.1E-7 \text{ m}^2/\text{s}$ was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 7.0E-8 to $4.0E-7 \text{ m}^2/\text{s}$. 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 4,726.6 kPa.

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

6.3.38 Section 505.55-510.55 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 33 kPa in 35 minutes. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than $1E-11 \text{ m}^2/\text{s}$). The test shows no hydraulic communication between the test interval and the adjacent zones. None of the test phases is analysable.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow model cannot be determined. No analysis was performed. The measured data is presented in Appendix 2-86.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is lower than $1E-11 \text{ m}^2/\text{s}$.

No further analysis recommended.

6.3.39 Section 510.56–515.56 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 2.02 L/min at start of the CHi phase to 1.59 L/min at the end, indicating a relatively high interval transmissivity. The recovery phase (CHir) shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in loglog coordinates. In case of the present test the CHi phase shows a downward trend at late times indicating an increase of transmissivity at some distance from the borehole or a flow dimension of 3. The CHir phase derivative is flat at middle times (radial flow) and shows a downward trend at late times, indicating an increase of transmissivity at some distance from the borehole. For the analysis of both phases a radial composite flow model was chosen. In addition, the Chi phase was analysed using a flow dimension of 3 and an infinite acting homogeneous radial flow model. The analysis is presented in Appendix 2-87.

Selected representative parameters

The recommended transmissivity of $2.4E-6 \text{ m}^2/\text{s}$ was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 9.0E-7 to $5.0E-6 \text{ m}^2/\text{s}$. 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 5,026.6 kPa.

The transmissivity derived from the alternative analysis of the CHi phase using a flow dimension of 3 is $1.0E-7 \text{ m}^2/\text{s}$.

The analysis of the CHi and CHir phases shows some inconsistencies that should be resolved in case further analysis of the test is planned. In this case we recommend conducting a full superposition transient analysis in order to account for pressure history effects and changing flow rates during the CHi phase. There are uncertainties concerning the flow dimension.

6.3.40 Section 515.56–520.56 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 226 kPa, followed by a pressure recovery phase. The test was accomplished without using the automatic regulation system. No hydraulic connection between test interval and

the adjacent zones was observed. The injection rate decreased from 57.5 mL/min at start of the CHi phase to 42.5 mL/min at the end, indicating a relatively low interval transmissivity. The CHir phase shows very fast recovery, such that the analysis does not provide reliable results. The results should be regarded as order of magnitude only.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase and the CHir phase show a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). For the analysis of the CHi phase a radial composite flow model was chosen. An infinite acting homogeneous radial flow model was chosen for the analysis of the CHir phase. The analysis is presented in Appendix 2-88.

Selected representative parameters

The recommended transmissivity of $4.5E-8 \text{ m}^2/\text{s}$ was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 9.0E-9 to $5.0E-8 \text{ m}^2/\text{s}$. 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 5,077.1 kPa.

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

6.3.41 Section 520.57-525.57 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. After 12 minutes an abrupt drop down of the flow rate from 0.355 L/min to 0.339 L/min was observed, the reason for this is unknown, the pressure in the section stayed stable. The second part of the CHi phase was not part of the analysis. The injection rate decreased during the entire injection phase from 0.46 L/min at start of the CHi phase to 0.33 L/min at the end, indicating a moderate interval transmissivity. The CHir phase shows very fast recovery, such that the analysis does not provide reliable results. The results should be regarded as order of magnitude only.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a downward trend at late times indicating an increase of transmissivity at some distance from the borehole or a flow dimension of 3 (spherical flow). The CHir phase derivative is flat at late times, which is indicative of a flow dimension of 2 (radial flow). For the analysis of the CHi phase a radial composite flow model was chosen. In addition the analysis was conducted using a flow dimension of 3. An infinite acting homogeneous radial flow model was chosen for the analysis of the CHir phase. The analysis is presented in Appendix 2-89.

Selected representative parameters

The recommended transmissivity of $2.7E-7 \text{ m}^2/\text{s}$ was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 9.0E-8 to $5.0E-7 \text{ m}^2/\text{s}$. 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 5,125.2 kPa.

The transmissivity derived from the alternative analysis of the CHi phase using a flow dimension of 3 is $2.2E-8 \text{ m}^2/\text{s}$.

The analysis of the CHi and CHir phases shows some inconsistencies that should be resolved in case further analysis of the test is planned. In this case we recommend conducting a full superposition transient analysis in order to account for pressure history effects and changing flow rates during the CHi phase. There are uncertainties concerning the flow dimension.

6.3.42 Section 545.62–550.62 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 190 kPa in 23 minutes to decrease again slowly without stabilization. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than $1E-11 \text{ m}^2/\text{s}$). The test shows no hydraulic communication between the test interval and the adjacent zones. None of the test phases is analysable.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow model cannot be determined. No analysis was performed. The measured data is presented in Appendix 2-90.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is lower than $1E-11 \text{ m}^2/\text{s}$.

No further analysis recommended.

6.3.43 Section 550.62–555.62 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 225 kPa, followed by a pressure recovery phase. The test was accomplished without using the automatic regulation system. No hydraulic connection between test interval and the adjacent zones was observed. Due to the very small injection rates, the rate measurements are very noisy. The injection rate decreased from 5.70 mL/min at start of the CHi phase to 1.90 mL/min at the end, indicating a low interval transmissivity. The recovery phase (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. In case of the present test the CHi phase shows a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). The data of the CHir phase does not allow for a specific determination of the flow dimension. It was analysed assuming a flow dimension of 2. For the analysis of the CHi phase a radial composite flow model was chosen. An infinite acting homogeneous radial flow model was chosen for the analysis of the Chir phase. The analysis is presented in Appendix 2-91.

Selected representative parameters

The recommended transmissivity of $2.8E-9 \text{ m}^2/\text{s}$ was derived from the analysis of the CHir phase, which shows the best data and derivative quality. It should be noted that due to the low flow rate the results are uncertain. The confidence range for the interval transmissivity is estimated to be 7.0E-10 to $4.0E-9 \text{ m}^2/\text{s}$. 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 5,409.3 kPa.

The analysis of the CHi and CHir phases shows inconsistencies, mainly caused by the noisy data of the Chi phase and the fact, that IARF was not measured during the CHir phase. No further analysis is recommended.

6.3.44 Section 555.63-560.63 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 225 kPa, followed by a pressure recovery phase. The test was accomplished without using the automatic regulation system. No hydraulic connection between test interval and the adjacent zones was observed. Due to the very small injection rates the rate measurements are noisy. The injection rate decreased from 3.28 mL/min at start of the CHi phase to 1.01 mL/min at the end, indicating a low interval transmissivity. The recovery phase (CHir) shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow dimension cannot be clearly derived from one of the phases. The analysis was conducted assuming a flow dimension of 2 (radial flow). An infinite acting homogeneous radial flow model was chosen for the analysis of the Chi phase and the CHir phase. The analysis is presented in Appendix 2-92.

Selected representative parameters

The recommended transmissivity of $1.3E-9 \text{ m}^2/\text{s}$ was derived from the analysis of the CHir phase, which shows the best data and derivative quality. Due to the low flow rate and the uncertainties concerning the flow dimension, the results are relative uncertain. The confidence range for the interval transmissivity is estimated to be 5.0E-10 to $3.0E-9 \text{ m}^2/\text{s}$. The analysis was conducted assuming a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 5,449.0 kPa.

The analysis of the CHi and CHir phases shows some inconsistencies, this being mainly caused by the very low interval transmissivity and the test design which was not optimized for this transmissivity range. No further analysis is recommended.

No further analysis is recommended.

6.3.45 Section 560.63–565.63 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 221 kPa, followed by a pressure recovery phase. The test was accomplished without using the automatic regulation system. No hydraulic connection between test interval and the adjacent zones was observed. Due to the very small injection rates the rate measurements are noisy. The injection rate decreased from 2.33 mL/min at start of the CHi phase to 0.29 mL/min at the end, indicating a low interval transmissivity. The recovery phase (CHir) shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow dimension cannot be clearly derived from one of the phases. The analysis was conducted assuming a flow dimension of 2 (radial flow). For the analysis of the CHi phase a radial composite flow model was chosen. An infinite acting homogeneous radial flow model was chosen for the analysis of the CHir phase. The analysis is presented in Appendix 2-93.

Selected representative parameters

The recommended transmissivity of $1.2E-9 \text{ m}^2/\text{s}$ was derived from the analysis of the CHir phase, which shows the best data and derivative quality. It should be noted that due to the very low flow rate and the uncertainties concerning the flow dimension, the results are uncertain. The confidence range for the interval transmissivity is estimated to be 1.0E-10 to $2.0E-9 \text{ m}^2/\text{s}$. The analysis was conducted assuming a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 5,507.0 kPa.

The analysis of the CHi and CHir phases shows inconsistencies, this being mainly caused by the very low interval transmissivity and the test design which was not optimized for this transmissivity range. No further analysis is recommended. No further analysis is recommended.

6.3.46 Section 565.64–570.64 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 212 kPa, followed by a pressure recovery phase. The test was accomplished without using the automatic regulation system. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 0.34 L/min at start of the CHi phase to 0.28 L/min at the end, indicating a relatively moderate interval transmissivity. The CHir phase shows relatively fast recovery, however, the data is of good quality and as such, amenable 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 and the CHir phase show a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-94.

Selected representative parameters

The recommended transmissivity of $5.8E-7 \text{ m}^2/\text{s}$ was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 3.0E-7 to $6.0E-7 \text{ m}^2/\text{s}$. 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 5,558.4 kPa.

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

6.3.47 Section 570.64-575.64 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 215 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate control during the CHi phase was not very good. In addition, due to the small injection rates (low transmissivity) the rate measurements are relatively noisy. The injection rate decreased from 114.5 mL/min at start of the CHi phase to 88.1 mL/min at the end, indicating a relatively low interval transmissivity. The CHir phase shows very fast recovery, such that the analysis does not provide reliable results. The results should be regarded as order of magnitude only.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows an upward trend at late times, which is indicative for a decrease of transmissivity at some distance from the borehole or a change to a flow dimension below 2. The analysis was conducted assuming a flow dimension of 2. The data of the CHir phase does not allow for a specific determination of the flow dimension. Again a flow dimension of 2 was assumed. For the analysis of the CHi phase a radial composite flow model was chosen. An infinite acting homogeneous radial flow model was chosen for the analysis of the CHir phase. The analysis is presented in Appendix 2-95.

Selected representative parameters

The recommended transmissivity of $1.7E-7 \text{ m}^2/\text{s}$ was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 7.0E-8 to $4.0E-7 \text{ m}^2/\text{s}$. The analysis was conducted assuming a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 5,609.7 kPa.

The analysis of the CHi and CHir phases shows some inconsistencies, mainly caused by the fast recovery of the CHir phase and the uncertainties concerning the flow dimension. In case further analysis of the test is planned, we recommend conducting a full superposition transient analysis in order to account for pressure history effects and changing flow rates during the CHi phase.

6.3.48 Section 575.65–580.65 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 198 kPa, followed by a pressure recovery phase. Due to the time needed to regulate stable pressure, the first part is not analysable. The pressure in the section below rose by 5 kPa during the injection phase, indicating a little connection to the section. The injection rate decreased from 0.59 L/min at start of the CHi phase to 0.38 L/min at the end, indicating a relatively moderate transmissivity. The CHir phase shows relatively fast recovery, however, the data is of good quality and as such, amenable for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase and the CHir phase show a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-96.

Selected representative parameters

The recommended transmissivity of $9.0E-7 \text{ m}^2/\text{s}$ was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 6.0E-7 to $2.0E-6 \text{ m}^2/\text{s}$. 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 5,658.4 kPa.

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

6.3.49 Section 580.65–585.65 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 201 kPa, followed by a pressure recovery phase. A little hydraulic connection between the test section and the section above is assumed (see test no 104). The injection rate control during the CHi phase was not very good. The results derived from the Chi phase are uncertain. The injection rate decreased from 0.43 L/min at start of the CHi phase to 0.31 L/min at the end, indicating a moderate low interval transmissivity. The CHir phase shows very fast recovery, such that the analysis does not provide reliable results. The results should be regarded as order of magnitude only.

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow dimension cannot be clearly derived from one of the phases. A flow dimension of 2 was assumed. An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-97.

Selected representative parameters

The recommended transmissivity of $3.3E-7 \text{ m}^2/\text{s}$ was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 8.0E-8 to $6.0E-7 \text{ m}^2/\text{s}$. The analysis was conducted assuming a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 5,711.9 kPa.

The analysis of the CHi and CHir phases shows some inconsistencies, mainly caused y the fast recovery if the CHir phase. No further analysis is recommended.

6.3.50 Section 585.67-590.67 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 217 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate control during the CHi phase was not very good. The injection rate decreased from 0.27 L/min at start of the CHi phase to 0.16 L/min at the end, indicating a relatively moderate interval transmissivity. The CHir phase shows very fast recovery, such that the analysis does not provide reliable results. The results should be regarded as order of magnitude only.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in loglog coordinates. In case of the present test the CHi phase shows a flat derivative at early and middle times, which is indicative of a flow dimension of 2 (radial flow). At late times the derivative shows an upward trend. The CHir phase derivative is flat at late times, indicating radial flow. For the analysis of the CHi phase a radial composite flow model was chosen. An infinite acting homogeneous radial flow model was chosen for the analysis of the CHir phase. The analysis is presented in Appendix 2-98.

Selected representative parameters

The recommended transmissivity of $2.1E-7 \text{ m}^2/\text{s}$ was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 8.0E-8 to $5.0E-7 \text{ m}^2/\text{s}$. 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 5,762.3 kPa.

The analysis of the CHi and CHir phases shows some inconsistency, essentially caused by the fast recovery of the CHir phase and from this resulting data quality of this phase.

6.3.51 Section 590.67–595.67 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. Due to the small injection rates, the rate measurements are relatively noisy. The injection rate decreased from 17.0 mL/min at start of the CHi phase to 7.2 mL/min at the end, indicating a relatively low interval transmissivity. The CHir phase shows very fast recovery, such that the analysis does not provide reliable results. The results should be regarded as order of magnitude only.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow dimension cannot be clearly derived from one of the phases. The analysis was conducted assuming a flow dimension of 2. For the analysis of the CHi phase a radial composite flow model was chosen. An infinite acting homogeneous radial flow model was chosen for the analysis of the CHir phase. The analysis is presented in Appendix 2-99.

Selected representative parameters

The recommended transmissivity of $6.1E-9 \text{ m}^2/\text{s}$ was derived from the analysis of the CHi phase. Due to the fast recovery and the noisy data of the Chi phase, the results are uncertain. The confidence range for the interval transmissivity is estimated to be 1.0E-9 to $9.0E-9 \text{ m}^2/\text{s}$. The analysis was conducted assuming a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 5,811.9 kPa.

The analysis of the CHi and CHir phases shows some inconsistencies, due to the problems mentioned above. No further analysis is recommended.

6.3.52 Section 595.69-600.69 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 234 kPa in 14 minutes to decrease after that slowly without stabilization. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than $1E-11 \text{ m}^2/\text{s}$). The test shows no hydraulic communication between the test interval and the adjacent zones. None of the test phases is analysable.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow model cannot be determined. No analysis was performed. The measured data is presented in Appendix 2-100.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is lower than $1E-11 \text{ m}^2/\text{s}$.

No further analysis recommended.

6.3.53 Section 600.69–605.69 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. The pressure below the section increased by 2 kPa, indicating a slight connection between the test section and the section below. The injection rate control during the CHi phase was good, although it was noisy. The injection rate decreased from 1.55 L/min at start of the CHi phase to 0.96 L/min at the end, indicating a relatively high interval transmissivity. The recovery phase (CHir) shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase and the CHir phase show a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). An infinite acting homogeneous radial flow model was chosen for the analysis of the CHi phase. For the analysis of the CHir phase a radial composite flow model was chosen. The analysis is presented in Appendix 2-101.

Selected representative parameters

The recommended transmissivity of $9.2E-7 \text{ m}^2/\text{s}$ was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 7.0E-7 to $3.0E-6 \text{ m}^2/\text{s}$. 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 5,907.7 kPa.

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

6.3.54 Section 605.69-610.69 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 230 kPa, followed by a pressure recovery phase. The pressure in the section below increased by 2 kPa, which indicates a little connection to the test section. Due to the time needed by the system, the first part (first minute) of the CHi phase is not analysable. The injection rate decreased from 0.50 L/min at start of the CHi phase to 0.30 L/min at the end, indicating a relatively moderate interval transmissivity. The CHir phase shows very fast recovery, such that the analysis does not provide reliable results. The results should be regarded as order of magnitude only.

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). At middle times it shows a downward trend, indicating an increase in transmissivity at some distance from the borehole. The data quality of the CHir phase is poor and as such not amenable to derive a flow dimension from this phase. The analysis was conducted assuming a flow dimension of 2. For the analysis of the CHi phase a two shell radial composite flow model was chosen. An infinite acting homogeneous radial flow model was chosen for the analysis of the CHir phase. The analysis is presented in Appendix 2-102.

Selected representative parameters

The recommended transmissivity of $2.9E-7 \text{ m}^2/\text{s}$ was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 1.0E-7 to $7.0E-7 \text{ m}^2/\text{s}$. 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 5,956.1 kPa.

6.3.55 Section 610.70-615.70 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 0.14 L/min at start of the CHi phase to 0.12 L/min at the end, indicating a relatively moderate interval transmissivity. The CHir phase shows very fast recovery, such that the analysis does not provide reliable results. The results should be regarded as order of magnitude only.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in loglog coordinates. In case of the present test the CHi phase shows a flat derivative at middle times, which is indicative of a flow dimension of 2 (radial flow). At the end it shows a sharp upward trend, caused by the noisy data. This part was not analysed. The data quality of the CHir phase does not allow for a specific determination of the flow dimension. An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-103.

Selected representative parameters

The recommended transmissivity of $2.6E-7 \text{ m}^2/\text{s}$ was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 9.0E-8 to $6.0E-7 \text{ m}^2/\text{s}$. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 6,003.1 kPa.

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

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

6.3.56 Section 615.70–620.70 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. The pressure in the section below rose during the injection phase by 6 kPa, indicating a hydraulic connection to the test section. Due to this there is an uncertainty connected with the determination of the transmissivity. The data of the CHir phase are relatively noisy, however, they are still adequate for quantitative analysis. The injection rate decreased from 0.99 L/min at start of the CHi phase to 0.85 L/min at the end, indicating a relatively high interval transmissivity. The CHir phase shows very fast recovery, such that the analysis does not provide reliable results. The results should be regarded as order of magnitude only.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in loglog coordinates. In case of the present test the CHi phase shows a flat derivative at middle and late times, which is indicative of a flow dimension of 2 (radial flow). The data of the CHir phase does not allow for a specific determination of the flow dimension. An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-104.

Selected representative parameters

The recommended transmissivity of $1.7E-6 \text{ m}^2/\text{s}$ was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 6.0E-7 to $4.0E-6 \text{ m}^2/\text{s}$. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 6,050.3 kPa.

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

6.3.57 Section 620.71-625.71 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. A hydraulic connection between test interval and the zone below was observed. The injection rate decreased from 0.59 L/min at start of the CHi phase to 0.49 L/min at the end, indicating a relatively moderate interval transmissivity. The CHir phase shows very fast recovery, such that the analysis does not provide reliable results. The results should be regarded as order of magnitude only.

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). The data quality of the CHir phase does not allow for a specific determination of the flow dimension. A flow dimension of 2 was assumed. An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-105.

Selected representative parameters

The recommended transmissivity of $5.5E-7 \text{ m}^2/\text{s}$ was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 2.0E-7 to $9.0E-7 \text{ m}^2/\text{s}$. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 6,096.4 kPa.

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

6.3.58 Section 625.71–630.71 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. Hydraulic connection between test interval and the zone above (see test no 113). The injection rate decreased from 2.32 L/min at start of the CHi phase to 1.76 L/min at the end, indicating a relatively high interval transmissivity. The recovery phase (CHir) shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase and the CHir phase show a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-106.

Selected representative parameters

The recommended transmissivity of $3.1E-6 \text{ m}^2/\text{s}$ was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 9.0E-7 to $6.0E-6 \text{ m}^2/\text{s}$. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 6,145.4 kPa.

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

6.3.59 Section 630.72-635.72 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 17 kPa in 30 minutes. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than $1E-11 \text{ m}^2/\text{s}$). The test shows no hydraulic communication between the test interval and the adjacent zones. None of the test phases is analysable.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow model cannot be determined. No analysis was performed. The measured data is presented in Appendix 2-107.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is lower than $1E-11 \text{ m}^2/\text{s}$.

No further analysis recommended.

6.3.60 Section 635.72-640.72 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 200 kPa in 30 minutes. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than $1E-11 \text{ m}^2/\text{s}$). The test shows no hydraulic communication between the test interval and the adjacent zones. None of the test phases is analysable.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow model cannot be determined. No analysis was performed. The measured data is presented in Appendix 2-108.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is lower than $1E-11 \text{ m}^2/\text{s}$.

No further analysis recommended.

6.3.61 Section 640.73-645.73 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 48 kPa in 30 minutes. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than $1E-11 \text{ m}^2/\text{s}$). The test shows no hydraulic communication between the test interval and the adjacent zones. None of the test phases is analysable.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow model cannot be determined. No analysis was performed. The measured data is presented in Appendix 2-109.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is lower than $1E-11 \text{ m}^2/\text{s}$.

No further analysis recommended.

6.3.62 Section 645.73–650.73 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 212 kPa, followed by a pressure recovery phase. The test was accomplished without using the automatic regulation system. No hydraulic connection between test interval and the adjacent zones was observed. Due to the small injection rates the rate measurements are relatively noisy. The injection rate decreased from about 5 mL/min at start of the CHi phase to about 4 mL/min at the end, indicating a low interval transmissivity. The recovery phase (CHir) shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test due to the very low flow rate, the data quality does not allow for a specific determination of the flow dimension. The analysis was conducted assuming a flow dimension of 2. An infinite acting homogeneous radial flow model was chosen for the analysis of the CHi and the CHir phase. The analysis is presented in Appendix 2-110

Selected representative parameters

The recommended transmissivity of $2.8E-9 \text{ m}^2/\text{s}$ was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 7.0E-10 to $5.0E-9 \text{ m}^2/\text{s}$. The analysis was conducted assuming a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 6,343.5 kPa.

The analysis of the CHi and CHir phases show some inconsistencies, this being mainly caused by the very low interval transmissivity and the test design which was not optimized for this transmissivity range. No further analysis is recommended.

6.3.63 Section 650.74–655.74 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 205 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. Due to the small injection rates the rate measurements are relatively noisy. The injection rate decreased from 1.4 mL/min at start of the CHi phase to 0.13 mL/min at the end, indicating a very low interval transmissivity. The recovery phase (CHir) shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow dimension cannot be clearly derived from one of the phases. A flow dimension of 2 was assumed. An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-111.

Selected representative parameters

The recommended transmissivity of $2.0E-10 \text{ m}^2/\text{s}$ was derived from the analysis of the CHir phase (inner zone), which shows the best data and derivative quality. It should be noted that due to the very small transmissivity the results are uncertain. The confidence range for the interval transmissivity is estimated to be 8.0E-11 to $6.0E-10 \text{ m}^2/\text{s}$. The analysis was conducted assuming a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 6,387.2 kPa.

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

6.3.64 Section 655.75-660.75 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 212 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. Due to the small injection rates the rate measurements are relatively noisy and the results of the analysis of the CHi phase should be regarded as order of magnitude only. The injection rate decreased from 1.32 mL/min at start of the CHi phase to 0.13 mL/min at the end, indicating a very interval transmissivity. The recovery phase (CHir) shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow dimension cannot be clearly derived

from one of the phases. The analysis was conducted assuming a flow dimension of 2. An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-112

Selected representative parameters

The recommended transmissivity of $2.1E-10 \text{ m}^2/\text{s}$ was derived from the analysis of the CHir phase, which shows the best data and derivative quality. It should be noted that due to the very small transmissivity the results are uncertain. The confidence range for the interval transmissivity is estimated to be 7.0E-11 to $6.0E-10 \text{ m}^2/\text{s}$. The analysis was conducted assuming a flow dimension of 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 6,441.5 kPa.

The analysis of the CHi and CHir phases show some inconsistencies, mainly caused by the noisy data of the CHi phase and the very small transmissivity. No further analysis is recommended.

6.3.65 Section 660.75–665.75 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 24 kPa in 30 minutes. This phenomenon is caused by prolonged packer expansion in a very tight section (T probably smaller than $1E-11 \text{ m}^2/\text{s}$). The test shows no hydraulic communication between the test interval and the adjacent zones. None of the test phases is analysable.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the flow model cannot be determined. No analysis was performed. The measured data is presented in Appendix 113.

Selected representative parameters

Based on the test response (prolonged packer compliance) the interval transmissivity is lower than $1E-11 \text{ m}^2/\text{s}$.

No further analysis recommended.

6.3.66 Section 665.76–670.76 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. A hydraulic connection between test interval and the bottom zone was observed. The injection rate control during the CHi phase was not good and the rate measurements are relatively noisy. The injection rate decreased from 0.12 L/min at start of the CHi phase to 0.10 L/min at the end, indicating a relatively moderate interval transmissivity. The recovery phase (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. In case of the present test the CHir phase shows a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). An infinite acting homogeneous radial flow model was chosen for the analysis of both phases. The analysis is presented in Appendix 2-114.

Selected representative parameters

The recommended transmissivity of $1.9E-7 \text{ m}^2/\text{s}$ was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 8.0E-8 to $5.0E-7 \text{ m}^2/\text{s}$. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 6,538.0 kPa.

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

6.3.67 Section 670.76-675.76 m, test no 1, injection

Comments to test

The test was composed of a constant pressure injection test phase with a pressure difference of 200 kPa, followed by a pressure recovery phase. No hydraulic connection between test interval and the adjacent zones was observed. The injection rate decreased from 0.21 L/min at start of the CHi phase to 0.14 L/min at the end, indicating a relatively moderate interval transmissivity. The recovery phase (CHir) shows no problems and is adequate for quantitative analysis.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the CHi phase shows a flat derivative at late times, which is indicative of a flow dimension of 2 (radial flow). The CHir phase derivative shows an upward trend at middle times and a downward trend at late times indicating changes of transmissivity at some distance from the borehole. The upward trend at late times was not analysed. An infinite acting homogeneous radial flow model was chosen for the analysis of the CHi phase. For the analysis of the CHir phase a radial composite flow model was chosen. The analysis is presented in Appendix 115. **Selected representative parameters**

The recommended transmissivity of $1.6E-7 \text{ m}^2/\text{s}$ was derived from the analysis of the CHir phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 8.0E-8 to $4.0E-7 \text{ m}^2/\text{s}$. The flow dimension displayed during the test is 2. The static pressure measured at transducer depth, was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 6,591.1 kPa.

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

6.3.68 Section 675.77–680.75 m, test no 1, pulse injection

Comments to test

The test was initiated as a constant pressure injection. However, after a few seconds of injection the rate quickly dropped to zero, indicating a very tight section. It was therefore decided to close the test valve and measure the pressure recovery. The pressure recovery was analysed as a pulse injection phase (Pi).

During the brief injection phase a total volume of 1.8 mL was injected (derived from the flowmeter measurements. This injected volume produced a pressure increase of 213.0 kPa. Using a dV/dP approach, the wellbore storage coefficient relevant for the subsequent pressure recovery can be calculated to $8.4E-12 \text{ m}^3/Pa$. It should be noted though that there is large uncertainty connected with the determination of the wellbore storage coefficient (probably one order of magnitude), which will implicitly translate into uncertainty in the derived transmissivity.

Flow regime and calculated parameters

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the Pi phase shows a flat derivative at middle times, which is indicative of a flow dimension of 2 (radial flow). At late times it shows a downward trend, indicating an increase of transmissivity at some distance from the borehole. For the analysis a radial composite flow model was chosen. The analysis is presented in Appendix 2-116.

Selected representative parameters

The recommended transmissivity of $2.7E-10 \text{ m}^2/\text{s}$ was derived from the analysis of the Pi phase. The confidence range for the interval transmissivity is estimated to be 8.0E-11 to $6.0E-10 \text{ m}^2/\text{s}$. It should be noted that due to the very low interval transmissivity the results are very uncertain. The flow dimension displayed during the test is 2. No static pressure could be derived.

6.3.69 Section 680.78–685.78 m, test no 1, pulse injection

Comments to test

The test was initiated as a constant pressure injection. However, after a few seconds of injection the rate quickly dropped to zero, indicating a very tight section. It was therefore decided to close the test valve and measure the pressure recovery. The pressure recovery was analysed as a pulse injection phase (Pi).

During the brief injection phase a total volume of 4.96 mL was injected (derived from the flowmeter measurements. This injected volume produced a pressure increase of 212.0 kPa. Using a dV/dP approach, the wellbore storage coefficient relevant for the subsequent pressure recovery can be calculated to $2.3E-11 \text{ m}^3$ /Pa. It should be noted though that there is large uncertainty connected with the determination of the wellbore storage coefficient (probably one order of magnitude), which will implicitly translate into uncertainty in the derived transmissivity.

The flow dimension is interpreted from the slope of the semi-log derivative plotted in log-log coordinates. In case of the present test the Pi phase shows a flat derivative at middle times, which is indicative of a flow dimension of 2 (radial flow). At late times it shows an upward trend indicating a decrease of transmissivity at some distance from the borehole. For the analysis a radial composite flow model was chosen. The analysis is presented in Appendix 2-117.

Selected representative parameters

The recommended transmissivity of $3.1E-9 \text{ m}^2/\text{s}$ was derived from the analysis of the Pi phase. Considering the inherent uncertainties related to the measurement (e.g. specially the measurement of the wellbore storage coefficient) and to the analysis process (e.g. numeric distortion when calculating the derivative and pressure history effects), the confidence range for the transmissivity is estimated to be 5E-10 to $5E-9 \text{ m}^2/\text{s}$. The flow dimension displayed during the test is 2. No static pressure could be derived.

7 Synthesis

The synthesis chapter summarizes the basic test parameters and analysis results. In addition, the correlation between steady state and transient transmissivities as well as between the matched and the theoretical wellbore storage (WBS) coefficient are presented and discussed.
Borehole	Borehole	Date and time	Date and time	å	Q ^m	tp	ţ,	p₀	ä	p _p	p,	Te	Test pha	ises measured
secup	seclow	for test, start	for test, stop										Analyse	d test phases
(m)	(m)	үүүүММDD hh:mm	YYYYMMDD hh:mm	(m³/s)	(m³/s)	(s)	(s)	(kPa)	(kPa)	(kPa)	(kPa)	(°C)	marked	bold
105.11	205.11	20040820 09:59	20040820 12:44	1.68E–04	1.74E–04	1800	1800	1986	1986	2181	1986	9.47	CHİ	CHir
205.34	305.34	20040820 14:50	20040820 16:01	NN#	NN#	NN#	NN#	NN#	NN#	NN#	NN#	11.18	CHİ	CHir
205.34	305.34	20040820 16:11	20040820 17:40	4.60E04	4.93E-04	1800	600	2965	2966	2987	2967	11.32	CHi	CHir
305.41	405.41	20040821 08:14	20040821 10:33	1.64E–04	1.72E–04	1800	1800	3944	3943	4146	3945	13.08	CHİ	CHir
405.49	505.49	20040821 11:48	20040821 13:37	8.41E-06	8.76E-06	1800	1200	4926	4926	5126	4926	14.63	CHi	CHir
505.55	605.55	20040821 14:57	20040821 16:40	5.78E-05	6.18E-05	1800	1200	5909	5906	6106	5907	16.31	CHİ	CHir
605.69	705.69	20040822 08:12	20040822 10:01	4.60E-05	4.78E-05	1800	1500	6884	6881	7082	6884	18.08	CHi	CHir
705.81	805.81	20040822 11:37	20040822 13:58	NN#	NN#	18	5400	7866	7876	8104	7980	19.66	Ë	
805.98	905.98	20040822 15:17	20040822 17:26	8.57E-07	1.01E-06	2700	1800	8844	8840	9040	8842	21.32	CHi	CHir
886.11	986.11	20040823 08:00	20040823 09:52	1.49E–05	1.50E-05	1800	1800	9627	9620	9819	9637	22.60	CHİ	CHir
105.21	125.21	20040824 07:29	20040824 08:57	5.00E-05	5.23E-05	1200	1200	1205	1209	1410	1209	8.62	CHi	CHir
125.25	145.25	20040824 09:54	20040824 11:20	3.05E-06	3.13E-06	1200	1200	1401	1402	1602	1402	8.84	CHİ	CHir
145.30	165.30	20040824 21:02	20040824 22:45	7.20E-07	8.02E-07	1200	1200	1597	1598	1798	1598	9.20	CHİ	CHir
165.30	185.30	20040824 23:44	20040825 01:18	8.97E-06	9.70E-06	1200	1200	1793	1793	1993	1793	9.48	CHİ	CHir
185.32	205.32	20040825 06:35	20040825 08:06	9.69E-05	1.05E-04	1200	1200	1988	1987	2188	1986	9.72	CHİ	CHir
205.34	225.34	20040825 08:49	20040825 10:26	4.67E–04	4.84E-04	1200	1200	2182	2182	2283	2184	9.98	CHİ	CHir
225.35	245.35	20040825 11:23	20040825 14:01	1.08E-05	4.25E-05	1200	1200	2379	2376	2576	2378	10.38	CHİ	CHir
245.38	265.38	20040830 07:53	20040830 09:17	2.73E-04	2.85E-04	1200	1200	2576	2576	2777	2576	10.52	CHİ	CHir
265.38	285.38	20040830 09:53	20040830 10:59	9.17E-06	9.62E-06	1200	1200	2772	2772	2976	2771	10.82	CHİ	CHir
285.40	305.40	20040825 22:12	20040826 01:14	4.12E–04	4.25E–05	1560	1200	2962	2968	3004	2969	11.37	CHİ	CHir
305.41	325.41	20040826 02:27	20040826 04:04	5.80E-06	6.27E-06	1200	1200	3160	3161	3362	3161	11.74	CHİ	CHir
325.44	345.44	20040826 06:31	20040826 07:55	2.43E–06	3.52E-06	1200	1200	3358	3356	3556	3356	12.07	CHi	CHir
345.44	365.44	20040826 08:37	20040826 09:59	1.56E–04	1.63E-04	1200	1200	3554	3550	3750	3553	12.43	CHi	CHir

Table 7-1. General test data from constant head injection tests in KLX04.

Summary of results

7.1

Borehole	Borehole	Date and time	Date and time	ď	å	tp	₽	b₀	ā	p _p	p⊧	Te	Test ph	ises measured
secup	seclow	for test, start	for test, stop										Analyse	d test phases
(m)	(m)	үүүүммрр hh:mm	үүүүММДД hh:mm	(m³/s)	(m³/s)	(s)	(s)	(kPa)	(kPa)	(kPa)	(kPa)	(°C)	marked	bold
365.47	385.47	20040826 10:38	20040826 12:12	6.80E-06	7.25E-06	1200	1200	3749	3748	3950	3748	12.76	CHi	CHir
385.47	405.47	20040826 14:00	20040826 15:53	1.07E–07	1.28E–07	1200	1200	3946	3945	4188	3945	13.08	CHİ	CHir
405.49	425.49	20040826 16:37	20040826 18:31	7.17E-06	7.33E-06	1200	1200	4142	4141	4341	4141	13.41	CHi	CHir
425.51	445.51	20040826 19:32	20040826 21:03	1.00E-06	1.13E-06	1200	1200	4337	4333	4532	4333	13.71	CHi	CHir
445.50	465.50	20040830 16:11	20040830 17:57	5.23E-08	7.27E–08	1200	2700	4537	4536	4762	4545	13.97	CHi	CHir
465.52	485.52	20040827 00:32	20040827 02:22	5.33E-07	6.35E-07	1200	1200	4730	4725	4922	4725	14.32	CHi	CHir
485.52	505.52	20040827 06:37	20040827 08:29	NN#	NN#	NN#	2400	4928	4929	5131	4932	14.63	Ë	
505.55	525.55	20040827 09:11	20040827 10:43	3.08E-05	3.21E-05	1200	1200	5117	5117	5317	5117	14.99	CHi	CHir
525.58	545.58	20040827 11:14	20040827 14:14	NN#	NN#	NN#	4800	5320	5320	5522	5336	15.34	Ρi	
545.62	565.62	20040827 19:34	20040827 20:42	5.72E-08	7.63E-08	1200	1800	5513	5517	5721	5517	15.68	CHi	CHir
565.64	585.64	20040827 21:41	20040827 23:14	1.00E-05	1.06E-05	1200	600	5710	5708	5909	5709	16.01	CHi	CHir
585.65	605.65	20040828 00:07	20040828 01:30	2.07E-05	2.27E-05	1200	600	5907	5904	6104	5905	16.34	CHİ	CHir
605.69	625.69	20040828 02:17	20040828 03:47	3.28E-05	3.45E-05	1200	1200	6104	6101	6301	6102	16.70	CHİ	CHir
625.71	645.71	20040828 06:37	20040828 07:58	3.22E-05	3.30E-05	1200	1200	6301	6298	6499	6297	16.99	CHi	CHir
645.73	665.73	20040828 08:45	20040828 10:12	8.33E-08	9.97E-08	1200	1200	6497	6497	6712	6503	17.33	CHİ	CHir
665.76	685.76	20040828 10:47	20040828 12:40	1.68E–06	2.55E-06	1200	1200	6692	6694	6903	6726	17.69	CHi	CHir
685.79	705.79	20040828 13:37	20040828 16:05	NN#	NN#	1200	1200	6889	6967	7182	7002	18.06	Ë	ı
805.98	825.98	20040828 17:59	20040828 19:02	NN#	NN#	NN#	NN#	8067	NN#	NN#	NN#	20.00	ı	ı
826.02	846.02	20040828 20:06	20040828 22:06	NN#	NN#	60	3600	8261	8293	8492	8415	20.34	ı	
846.05	866.05	20040828 22:55	20040829 00:01	NN#	NN#	NN#	NN#	8457	NN#	NN#	NN#	20.66	ı	
866.08	886.08	20040829 00:49	20040829 02:21	7.42E–07	8.37E-07	1200	1200	8653	8645	8826	8647	20.99	CHi	CHir
886.11	906.11	20040831 01:49	20040831 03:53	2.83E-07	3.27E-07	1200	1200	8846	8842	9066	8842	21.32	CHİ	CHir
906.16	926.16	20040831 06:18	20040831 07:44	6.43E-06	7.25E-06	1200	1200	9045	9038	9240	9043	21.64	CHİ	CHir
926.18	946.18	20040831 08:16	20040831 09:47	6.62E-06	7.50E-06	1200	1200	9240	9237	9437	9249	21.96	CHİ	CHir
943.05	963.05	20040831 10:30	20040831 12:18	2.62E-06	2.95E-06	1200	1200	9399	9401	9603	9400	22.23	CHi	CHir
963.05	983.05	20040831 12:54	20040831 14:12	1.85E–06	2.03E-06	1200	1200	9601	9589	9799	9590	22.55	CHi	CHir

Borehole	Borehole	Date and time	Date and time	ď	ď	e B	ٿو.	ď	ā	ď	å	Te	Test pha	ses measured
secup	seclow	for test, start	for test, stop							-			Analysec	test phases
(m)	(m)	ти: на по по по по по по по по по по по по по	тин от тик	(m³/s)	(m³/s)	(s)	(s)	(kPa)	(kPa)	(kPa)	(kPa)	(°C)	marked t	old
300.41	305.41	20040901 10:29	20040901 11:52	1.03E-06	1.29E–06	1200	1200	2969	2968	3160	2968	11.08	CHi	CHir
305.41	310.41	20040901 13:06	20040901 14:06	NN#	NN#	NN#	∧N#	3017	3020	NN#	NN#	11.34		ı
310.42	315.42	20040901 14:43	20040901 15:54	5.00E-06	5.42E-06	1200	1200	3066	3065	3285	3064	11.47	CHİ	CHir
315.43	320.43	20040901 16:25	20040901 18:07	5.37E-06	5.63E-06	1200	600	3114	3113	3314	3113	11.58	CHi	CHir
320.43	325.43	20040901 18:55	20040901 20:41	2.72E–07	3.45E-07	1200	1200	3162	3161	3363	3161	11.69	CHİ	CHir
325.44	330.44	20040901 23:17	20040902 01:02	1.00E-06	1.14E–06	1200	300	3213	3211	3418	3210	11.77	CHi	CHir
330.44	335.44	20040902 05:51	20040902 07:06	2.50E-08	4.81E-08	1200	1200	3263	3261	3477	3261	11.85	CHİ	CHir
335.44	340.44	20040902 07:47	20040902 08:53	2.25E–06	2.48E–06	1200	300	3312	3310	3512	3309	11.93	CHİ	CHir
340.44	345.44	20040902 09:24	20040902 10:31	6.17E-07	6.56E-07	1200	300	3361	3359	3557	3359	12.05	CHİ	CHir
345.44	350.44	20040902 11:09	20040902 12:32	2.97E–06	3.40E-06	1200	1200	3410	3408	3607	3408	12.15	CHİ	CHir
350.45	355.45	20040902 13:20	20040902 14:49	1.29E–04	1.35E–04	1200	1200	3458	3457	3658	3458	12.24	CHİ	CHir
355.47	360.47	20040902 15:14	20040902 16:29	1.98E–05	3.15E-05	1200	600	3508	3507	3707	3506	12.35	CHİ	CHir
360.47	365.47	20040902 16:57	20040902 18:05	7.27E–06	7.55E-06	1200	600	3556	3555	3749	3553	12.43	CHİ	CHir
365.47	370.47	20040902 20:18	20040902 21:54	1.83E–07	2.03E-07	1200	1200	3602	3602	3844	3600	12.52	CHİ	CHir
370.47	375.47	20040902 22:36	20040903 00:16	1.07E–06	1.17E-06	1200	006	3649	3647	3839	3647	12.61	CHİ	CHir
375.47	380.47	20040903 05:55	20040903 07:06	5.38E-06	5.97E-06	1020	660	3698	3694	3884	3694	12.68	CHi	CHir
380.47	385.47	20040903 07:31	20040903 08:51	3.30E-07	3.57E-07	1200	1200	3745	3744	3947	3745	12.76	CHİ	CHir
385.47	390.47	20040903 09:25	20040903 11:06	NN#	4.25E-05	NN#	3600	3797	3807	4009	3918	12.85	Ē	ı
390.48	395.48	20040903 12:21	20040903 13:42	NN#	4.25E-05	0	2400	3845	3859	4061	3892	12.93	Ē	ı
395.48	400.48	20040903 14:09	20040903 15:43	NN#	4.25E-05	0	1800	3895	3930	4138	4091	13.01	Ē	ı
400.48	405.48	20040903 16:10	20040903 17:49	3.67E-07	4.13E-07	1200	1200	3946	3944	4156	3943	13.10	CHİ	CHir
405.49	410.49	20040903 18:30	20040903 20:05	1.78E–07	2.05E-07	1200	1200	3992	3992	4207	3991	13.18	CHİ	CHir
410.50	415.50	20040903 21:22	20040903 23:01	3.33E-08	3.83E-08	1200	1200	4042	4040	4257	4040	13.26	CHİ	CHir
415.51	420.51	20040903 23:33	20040904 01:10	7.67E–06	8.00E-06	1200	1200	4090	4088	4288	4088	13.34	CHİ	CHir
420.51	425.51	20040904 06:01	20040904 07:25	NN#	4.25E-05	NN#	2100	4139	4143	4343	4158	13.39	Ē	ı
425.51	430.51	20040904 07:55	20040904 09:06	NN#	4.25E–05	NN#	1800	4188	4192	4398	4196	13.47	Ē	

Borehole	Borehole	Date and time	Date and time	ď	å	đ	ٿو.	ď	ā	ď	å	Te	Test pha	ses measured
secup	seclow	for test, start	for test, stop										Analyse	d test phases
(m)	(m)	үүүүммдд hh:mm	үүүүммрр hh:mm	(m³/s)	(m³/s)	(s)	(s)	(kPa)	(kPa)	(kPa)	(kPa)	(°C)	marked	pold
430.51	435.51	20040904 09:37	20040904 11:35	6.67E-08	7.17E-08	1200	3600	4237	4238	4450	4242	13.54	CHİ	CHir
435.50	440.50	20040904 12:31	20040904 13:31	NN#	NN#	NN#	NN#	4289	NN#	NN#	NN#	13.62	ı	I
440.50	445.50	20040904 14:00	20040904 15:07	1.03E-06	1.10E-06	1200	300	4340	4337	4548	4336	13.70	CHi	CHir
445.50	450.50	20040904 15:38	20040904 17:26	NN#	NN#	NN#	2400	4389	4404	4607	4504	13.77	Ë	ı
450.50	455.50	20040904 18:04	20040904 19:32	4.33E-08	4.73E-08	1200	1200	4438	4445	4653	4454	13.85	CHi	CHir
455.50	460.50	20040904 20:00	20040904 22:34	3.75E–05	4.25E-05	NN#	3600	4485	4497	4699	4582	13.93	Ë	ı
460.51	465.51	20040904 23:06	20040905 00:34	1.00E-08	2.18E–08	1200	1200	4533	4531	4751	4533	14.01	CHi	CHir
465.52	470.52	20040905 01:14	20040905 02:44	1.08E–07	1.33E-07	1200	1200	4583	4580	4799	4589	14.08	CHi	CHir
470.52	475.52	20040905 05:46	20040905 06:52	NN#	NN#	NN#	NN#	4634	NN#	NN#	NN#	14.15		ı
475.52	480.52	20040905 07:27	20040905 08:31	NN#	4.25E-05	NN#	NN#	4683	NN#	NN#	NN#	14.22		ı
480.52	485.52	20040905 08:57	20040905 10:00	8.50E-07	9.17E-07	1200	300	4732	4726	4943	4727	14.31	CHi	CHir
505.55	510.55	20040905 10:34	20040905 12:06	NN#	NN#	NN#	NN#	4977	NN#	NN#	NN#	14.71	ı	I
510.56	515.56	20040905 12:46	20040905 13:58	2.66E–05	2.74E–05	1200	600	5029	5025	5226	5026	14.81	CHi	CHir
515.56	520.56	20040905 14:22	20040905 15:34	6.83E-07	7.83E-07	1200	300	5079	5077	5301	5077	14.91	CHİ	CHir
520.57	525.57	20040905 16:00	20040905 17:24	5.55E-06	6.00E-06	1200	600	5128	5124	5325	5124	14.99	CHİ	CHir
545.62	550.62	20040905 18:17	20040905 19:22	NN#	NN#	NN#	NN#	5372	NN#	NN#	NN#	15.41		I
550.62	555.62	20040905 20:03	20040905 21:30	3.83E-08	4.33E-08	1200	1200	5421	5417	5641	5418	15.50	CHi	CHir
555.63	560.63	20040905 22:32	20040906 00:17	1.67E–08	2.17E–08	1200	1200	5468	5464	5689	5468	15.58	CHi	CHir
560.63	565.63	20040906 00:46	20040906 02:36	7.00E-09	1.23E–08	1200	2400	5517	5515	5736	5514	15.65	CHi	CHir
565.64	570.64	20040906 06:09	20040906 07:11	4.62E-06	4.75E-06	1200	300	5565	5559	5772	5560	15.74	CHİ	CHir
570.64	575.64	20040906 07:42	20040906 08:47	1.47E–06	1.57E-06	1200	300	5613	5607	5823	5609	15.82	CHİ	CHir
575.65	580.65	20040906 09:15	20040906 10:19	6.30E-06	6.48E–06	1020	600	5662	5659	5857	5660	15.91	CHi	CHir
580.65	585.65	20040906 10:50	20040906 12:11	5.13E-06	5.42E-06	1200	1200	5713	5710	5911	5712	15.99	CHi	CHir
585.67	590.67	20040906 13:11	20040906 14:14	2.72E–06	3.20E-06	1200	300	5764	5762	5979	5763	16.07	CHi	CHir
590.67	595.67	20040906 14:45	20040906 15:52	1.17E–07	1.50E-07	1200	600	5815	5814	6027	5814	16.16	CHİ	CHir
595.69	600.69	20040906 16:36	20040906 18:14	NN#	NN#	NN#	NN#	5862	NN#	NN#	NN#	16.24	ı	

Borehole	Borehole	Date and time	Date and time	ď	å	þ	ت د	ď	ā	ď	₽	Te	Test pha	ses measured
secup	seclow	for test, start	for test, stop										Analysed	I test phases
(u)	(m)	үүүүммрр hh:mm	тин адмууу	(m³/s)	(m³/s)	(s)	(s)	(kPa)	(kPa)	(kPa)	(kPa)	(°c)	marked k	old
600.69	605.69	20040906 18:43	20040906 20:11	1.60E-05	1.73E-05	1200	1200	5909	5908	6107	5908	16.32	CHi	CHir
605.69	610.69	20040906 20:57	20040906 22:11	5.05E-06	5.37E-06	1200	300	5959	5956	6186	5956	16.40	CHi	CHir
610.70	615.70	20040906 22:41	20040907 00:09	2.07E-06	2.15E–06	1200	300	6008	6004	6203	6003	16.49	CHi	CHir
615.70	620.70	20040907 00:39	20040907 02:03	1.45E–05	1.50E-05	1200	1200	6055	6052	6251	6051	16.58	CHi	CHir
620.71	625.71	20040907 06:12	20040907 07:18	8.25E-06	8.73E-06	1200	300	6102	6097	6298	6098	16.67	CHi	CHir
625.71	630.71	20040907 07:41	20040907 08:50	2.93E-05	3.04E-05	1200	600	6151	6147	6347	6148	16.75	CHi	CHir
630.72	635.72	20040907 09:16	20040907 10:15	NN#	NN#	NN#	∧N#	6199	6221	NN#	NN#	16.83		
635.72	640.72	20040907 10:44	20040907 11:53	NN#	NN#	NN#	∧N#	6248	6447	NN#	NN#	16.90		
640.73	645.73	20040907 12:29	20040907 13:29	NN#	NN#	NN#	NN#	6299	6347	NN#	NN#	16.97		ı
645.73	650.73	20040907 14:03	20040907 15:10	6.67E-08	6.67E-08	1200	600	6350	6354	6566	6352	17.05	CHi	CHir
650.74	655.74	20040907 15:37	20040907 17:38	5.00E-09	6.67E-09	1200	1800	6405	6410	6614	6408	17.13	CHi	CHir
655.75	660.75	20040907 18:16	20040907 20:10	3.42E-09	5.00E-09	1200	2400	6450	6458	6662	6455	17.22	CHi	CHir
660.75	665.75	20040907 22:36	20040907 23:37	NN#	NN#	NN#	NN#	6498	NN#	NN#	NN#	17.31	ı	ı
665.76	670.76	20040908 00:22	20040908 02:26	1.63E-06	1.72E–06	1200	1200	6546	6540	6742	6541	17.40	CHi	CHir
670.76	675.76	20040908 10:39	20040908 12:33	2.27E-06	2.52E-06	1200	1200	6593	6299	6798	6601	17.48	CHİ	CHir
675.77	680.77	20040908 14:08	20040908 15:45	NN#	NN#	NN#	1800	6646	6648	6861	6651	17.57	Ē	ı
680.78	685.78	20040908 16:18	20040908 17:35	NN#	NN#	NN#	1800	6695	6703	6915	6703	17.66	Ē	ı
NN#	not analysed													

constant head injection phase recovery phase following the constant head injection phase Pulse injection Pi CHir Pi CHir

Interval	position	Stationary parameter:	flow s	Transier	nt analysis													
				Flow reç	jime	Formation	ı paramete	rs								., .	Static	(0
dn	low	Q/s	T	Perturb phase	Recovery phase	ц Н	T_{t_2}	T _s ,	T_{s^2}	Ļ	T _{TMIN}	T _{TMAX}	υ	~	dt,	dt ₂ p	*0	h _{wif}
m btoc	m btoc	m²/s	m²/s			m²/s	m²/s	m²/s	m²/s	m²/s	m²/s	m²/s	m³/Pa	-	min	min	кРа	masl
105.11	205.11	8.45E-06	1.10E-05	2	WBS2	2.2E-05	NN#	3.6E-05	NN#	2.2E-05	8.0E-06	4.0E-05	3.0E-09	9.4	0.7	16.9	986.4	13.51
205.34	305.34	2.15E-04	2.80E-04	2	WBS2	2.7E-04	NN#	2.1E-04	NN#	2.1E–04	1.0E04	4.0E04	2.2E-07	-3.9	1.9	4.8	2966.1	13.64
305.41	405.41	7.93E-06	1.03E-05	2	WBS2	1.5E-05	NN#	5.4E-05	NN#	5.4E-05	7.5E-06	6.5E-05	4.1E-09	2.7	1.3	25.2	3943.1	13.61
405.49	505.49	4.12E-07	5.37E-07	2	WBS2	1.0E-06	NN#	1.8E-06	NN#	1.0E-06	5.0E-07	2.0E06	8.9E-10	8.2	4.4	22.2	1924.2	13.97
505.55	605.55	2.83E-06	3.69E–06	2	WBS22	4.1E-06	NN#	3.3E-06	1.6E–05	4.1E-06	1.0E-06	5.0E06	1.3E-09	0.9	3.4	8.2	s905.1	14.35
605.69	705.69	2.24E-06	2.92E-06	7	WBS22	3.9E-06	NN#	3.3E-06	1.7E–05	3.9E-06	2.0E-06	5.0E-06	2.9E–10	2.6	2.2	23.3 (882.9	14.40
705.81	805.81	NN#	NN#	NN#	WBS22	NN#	NN#	3.5E-10	8.8E-11	3.5E-10	8.0E-11	7.0E-10	1.4E–10	2.7	0.3	2.5 ≠	₹NV	NN#
805.98	905.98	4.21E-08	5.48E-08	2	WBS2	4.3E-08	NN#	3.0E-07	NN#	4.3E–08	2.0E-08	8.0E-08	3.0E-10	0.0	3.1	17.0 8	838.7	14.81
886.11	986.11	7.36E–07	9.58E-07	7	WBS2	6.1E-07	NN#	8.2E-07	NN#	8.2E–07	6.0E-07	1.0E-06	2.1E–09	-1.4	4.0	24.9	9623.8	15.32
105.21	125.21	2.44E–06	2.55E–06	22	WBS22	2.6E-06	1.0E-05	2.5E-06	1.4E–05	2.6E–06	9.0E07	5.0E-06	1.8E-09	2.3	1.9	3.5 、	208.4	13.67
125.25	145.25	1.50E-07	1.56E–07	22	WBS2	3.2E-07	1.4E–05	5.6E-07	NN#	5.6E-07	1.0E-07	7.0E-07	8.4E–11	17.3	1.9	8.1	402.5	13.52
145.30	165.30	3.53E-08	3.69E–08	7	WBS22	5.8E-08	NN#	2.6E-08	1.3E–07	5.8E-08	2.0E-08	7.0E-08	6.4E11	6.8	1.1	10.8	596.4	13.35
165.30	185.30	4.40E-07	4.60E-07	7	WBS2	5.4E-07	NN#	1.7E-06	NN#	5.4E-07	3.0E-07	7.0E-07	1.3E-10	2.6	0.8	14.2 、	792.2	13.41
185.32	205.32	4.73E-06	4.95E–06	2	WBS2	5.9E-06	NN#	2.2E-05	NN#	5.9E-06	4.0E06	2.0E-05	1.3E-09	1.9	8.3	12.5 、	985.7	13.22
205.34	225.34	4.54E-05	4.75E–05	22	WBS2	6.6E-05	1.5E–04	8.1E-05	NN#	8.1E-05	4.0E-05	9.0E-05	2.4E–08	1.8	1.4	16.2	2181.6	13.28
225.35	245.35	6.67E–07	6.98E–07	22	WBS2	6.2E-07	3.3E–07	4.5E-06	NN#	6.2E-07	3.0E-07	8.0E-07	6.5E-11	-1.8	0.6	2.1	2379.4	13.53
245.38	265.38	1.33E-05	1.39E–05	22	WBS2	2.1E–05	5.5E-05	4.8E-05	NN#	2.1E–05	9.0E-06	4.0E-05	3.8E-09	1.6	0.4	4.1	2574.6	13.50
265.38	285.38	4.41E-07	4.61E-07	22	WBS2	5.2E-07	1.1E-06	1.7E-06	NN#	1.7E–06	4.0E-07	2.0E-06	1.1E–10	14.9	0.5	6.9	2771.1	13.63
285.40	305.40	1.12E-04	1.17E–04	7	WBS22	9.7E-05	NN#	5.1E-05	1.0E-04	5.1E-04	4.0E-05	2.0E04	4.0E-08	-5.9	6.8	17.0	967.3	13.70
305.41	325.41	2.83E-07	2.96E–07	7	WBS2	5.4E-07	NN#	1.3E-06	NN#	5.4E-07	2.0E-07	7.0E-07	1.8E–10	4.6	0.9	7.9	3161.4	13.57
325,44	345.44	1.19E-07	1.25E-07	2	WBS2	8.8E-08	NN#	1.0E-06	NN#	8.8E-08	7.0E-08	2.0E-07	7.3E-11	-2.5	0.5	83	355.9	13.46

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Table

	tatic onditions	hwif hwif	Pa masl	551.2 13.46	748.2 13.60	943.6 13.60	139.8 13.67	333.3 13.46	526.0 13.19	723.8 13.42	∧N# ∧N	115.3 13.47	NN# NN;	509.9 13.81	706.9 13.96	904.6 14.20	101.9 14.37	296.5 14.28	487.5 13.84	675.0 13.03	NN# NN;	NN# NN;	∧N# ∧N	∧N# ∧N	
	0 0	dt₂ p	min k	15.4 3	9.6 3	5.8 3	11.0 4	6.3 4	11.2 4	18.8 4	# ///#	1.6 5	16.8 #	14.4 5	16.2 5	14.9 5	14.7 6	1.8 6	14.1 6	0.2 6	# ^N#	# ^N#	# /N#	# /N#	
		dt,	min	1.5	0.9	0.4	3.4	1.2	5.4	1.3	NN#	0.4	1.8	2.9	4.6	1.6	0.2	0.3	1.4	0.1	NN#	NN#	NN#	NN#	
		ŝ	I	30.2	4.6	1.7	30.1	0.9	-1.6	-1.2	1.6	1.5	3.3	6.0-	0.0	-0.5	3.8	1.9	ი. ი	6.0-	5.9	NN#	NN#	NN#	
		U	m³/Pa	5.0E-09	1.5E–10	5.5E-11	6.8E-10	6.0E-11	1.6E–10	1.5E-11	3.0E11	4.3E-10	3.4E-11	7.4E–11	1.1E-09	9.3E-10	6.2E-10	2.6E-10	4.8E–11	5.0E-11	3.4E11	NN#	NN#	NN#	
		Ттмах	m²/s	6.0E-05	8.0E-07	6.0E-09	4.0E-06	8.0E-08	4.0E-09	4.0E-08	1.0E-09	3.0E-06	7.0E-10	3.0E-09	1.0E-06	4.0E06	6.0E-06	4.0E-06	4.0E-09	5.0E-07	6.0E-10	1.0E-13	1.0E-13	1.0E-13	
		T _{TMIN}	m²/s	8.0E-06	2.0E-07	2.0E-09	3.0E-07	3.0E-08	7.0E-10	8.0E-09	1.0E-10	9.0E07	7.0E-11	9.0E-10	3.0E-07	8.0E07	1.0E-06	1.0E-06	9.0E-10	7.0E-08	9.0E-11	1.0E-11	1.0E-11	1.0E-11	
		ŕ	m²/s	5.6E-05	6.4E-07	4.4E09	2.5E-06	5.7E-08	8.2E-10	1.8E–08	2.1E–10	2.1E-06	4.1E–10	1.3E–09	9.5E-07	1.2E–06	3.0E-06	2.2E-06	2.5E-09	2.5E-07	1.8E–10	1.0E–11	1.0E–11	1.0E–11	
		T_{s^2}	m²/s	NN#	NN#	NN#	NN#	NN#	NN#	NN#	9.9E–10	1.1E-05	2.1E–09	NN#	NN#	5.2E-06	NN#	2.8E-05	NN#	1.3E-05	3.6E-10	NN#	NN#	NN#	
	ers	T _s ,	m²/s	5.6E-05	2.2E-06	3.1E-08	2.5E-06	2.5E-07	1.7E-09	1.0E-07	2.1E-10	2.1E-06	4.1E-10	8.3E-09	3.0E-06	1.0E-06	7.3E-06	2.2E-06	4.1E-09	2.5E-07	1.8E–10	NN#	NN#	NN#	
	n paramet	\mathbf{T}_{12}	m²/s	NN#	NN#	NN#	1.6E–06	NN#	NN#	NN#	NN#	4.3E-06	NN#	NN#	NN#	NN#	NN#	2.0E-05	NN#	5.2E-06	NN#	NN#	NN#	NN#	
	Formatio	T ₁	m²/s	1.7E-05	6.4E-07	4.4E09	3.2E-07	5.7E-08	8.2E-10	1.8E-08	NN#	2.1E–06	NN#	1.3E-09	9.5E-07	1.2E-06	3.0E-06	2.0E-06	2.5E-09	1.3E-07	NN#	NN#	NN#	NN#	
nt analysis	gime	Recovery phase		WBS2	WBS2	WBS2	WBS2	WBS2	WBS2	WBS2	WBS22	WBS22	WBS22	WBS2	WBS2	WBS22	WBS2	WBS22	WBS2	WBS22	WBS22	NN#	NN#	NN#	
Transie	Flow re	Perturb phase		5	7	7	22	7	7	2	NN#	22	NN#	2	22	7	2	22	7	22	NN#	NN#	NN#	NN#	,
flow		₽	m²/s	8.02E-06	3.45E–07	4.50E-09	3.68E-07	5.16E-08	2.37E-09	2.78E-08	NN#	1.58E-06	NN#	2.88E-09	5.11E-07	1.06E-06	1.68E-06	1.64E-06	3.98E–09	8.27E-08	NN#	NN#	NN#	NN#	
Stationary parameters		Q/s	m²/s	7.67E-06	3.30E-07	4.31E-09	3.52E-07	4.93E-08	2.27E-09	2.66E-08	NN#	1.51E-06	NN#	2.75E-09	4.88E-07	1.02E-06	1.61E-06	1.57E-06	3.80E-09	7.90E-08	NN#	NN#	NN#	NN#	
osition		low	m btoc	365.44	385.47	405.47	425.49	445.51	465.50	485.52	505.52	525.55	545.58	565.62	585.64	605.65	625.69	645.71	665.73	685.76	705.79	825.98	846.02	866.05	
Interval p		dn	m btoc	345.44	365.47	385.47	405.49	425.51	445.50	465.52	485.52	505.55	525.58	545.62	565.64	585.65	605.69	625.71	645.73	665.76	685.79	805.98	826.02	846.05	

Interval	position	Stationary parameters	flow	Transien	ıt analysis													
				Flow reg	jime	Formatior	ו paramete	ស្									Static	ß
dn	low	Q/s	₽	Perturb phase	Recovery phase	ц,	T_{t_2}	T _s ,	T_{s_2}	Ļ	T _{TMIN}	T _{TMAX}	υ	~	dt,	dt ₂ I	*	h _{wif}
m btoc	m btoc	m²/s	m²/s			m²/s	m²/s	m²/s	m²/s	m²/s	m²/s	m²/s	m³/Pa	1	min	nin	қРа	masl
886.11	906.11	1.24E-08	1.30E-08	22	WBS22	8.6E-09	1.4E-08	1.6E-08	5.3E-08	1.6E-08	7.0E-09	4.0E-08	8.7E-11	4.8	NN#	° NN#	3839.4	14.75
906.16	926.16	3.12E-07	3.27E-07	2	WBS2	2.9E-07	NN#	2.5E-07	3.9E–07	2.9E–07	5.0E-08	4.0E-07	1.2E–10	<u>-</u>	1.2	10.5	9036.0	14.89
926.18	946.18	3.25E-07	3.40E-07	2	WBS2	2.5E-07	NN#	2.4E07	NN#	2.4E07	5.0E-08	4.0E-07	9.7E–11	-2.3	0.2	18.8	9233.3	15.14
943.05	963.05	1.27E–07	1.33E-07	22	WBS22	1.6E-07	1.0E-07	2.7E-07	1.9E07	2.7E-07	9.0E-08	4.0E-07	9.0E-11	5.2	1.2	3.6	395.9	14.97
963.05	983.05	8.64E-08	9.04E-08	2	WBS2	8.2E-08	NN#	4.1E-07	NN#	8.2E-08	5.0E-08	2.0E07	6.1E-10	0.5	1.1	16.2	9586.7	14.58
300.41	305.41	5.28E-08	4.36E-08	2	WBS2	9.1E-08	NN#	4.1E-07	NN#	9.1E-08	3.0E-08	2.0E-07	1.6E–11	1.9	0.1	1.0	2968.2	13.79
305.41	310.41	NN#	NN#	NN#	NN#	NN#	NN#	NN#	NN#	1.0E-11	1.0E–11	1.0E-13	NN#	NN#	NN#	۴ NN#	NN≄	NN#
310.42	315.42	2.23E-07	1.84E-07	22	WBS22	4.6E-07	2.7E-07	1.0E-06	NN#	4.6E07	1.0E-07	8.0E07	4.8E–11	5.5	1.0	2.5	3063.3	13.52
315.43	320.43	2.62E-07	2.16E-07	2	WBS2	7.2E-07	NN#	1.2E-06	NN#	7.2E–07	2.0E-07	9.0E07	3.6E–11	9.4	0.8	4.0	3113.1	13.61
320.43	325.43	1.32E–08	1.09E-08	22	WBS2	1.4E–08	6.5E-09	1.0E-07	NN#	1.4E–08	6.0E-09	4.0E-08	1.5E–11	0.0	0.2	<u>+</u> .	3161.4	13.55
325.44	330.44	5.21E-08	4.30E-08	22	WBS2	2.8E-08	2.4E–07	2.3E-07	NN#	2.3E-07	8.0E-08	5.0E-07	1.5E–11	21.6	0.7	2.2	3210.4	13.56
330.44	335.44	1.14E–09	9.37E-10	2	WBS2	2.6E-08	NN#	1.3E-08	NN#	1.3E-08	3.0E-09	4.0E-08	2.0E-11	33.0	NN#	NN#	3258.0	13.44
335.44	340.44	1.09E-07	9.02E-08	2	NN#	8.5E-08	NN#	NN#	NN#	8.5E-08	5.0E-08	3.0E07	NN#	-1.	0.5	8.5	3309.9	13.75
340.44	345.44	3.06E-08	2.52E-08	2	WBS2	3.2E-08	NN#	1.9E-07	NN#	3.2E-08	1.0E-08	6.0E-08	1.5E–11	1.3	0.4	6.9	3360.4	13.92
345.44	350.44	1.46E–07	1.21E-07	2	NN#	1.1E–07	NN#	NN#	NN#	1.1E-07	7.0E-08	4.0E-07	NN#	-1.5	7.3	17.0	3408.1	13.80
350.45	355.45	6.31E-06	5.21E-06	2	WBS2	1.5E-05	NN#	4.9E-05	NN#	1.5E-05	6.0E-06	4.0E-05	1.9E–09	5.9	3.7	16.4	3457.1	13.81
355.47	360.47	9.73E-07	8.03E-07	22	WBS2	8.2E-07	6.0E-06	9.1E-06	NN#	9.1E-06	1.0E-06	1.0E-07	2.9E-10	31.7	0.9	3.4	3506.4	13.84
360.47	365.47	3.67E-07	3.03E-07	2	WBS2	9.2E-07	NN#	1.6E-06	NN#	9.2E07	5.0E-07	2.0E-07	6.9E-11	8.6	0.6	17.8	3553.3	13.64
365.47	370.47	7.43E-09	6.13E-09	22	WBS2	3.3E-09	NN#	5.1E-08	NN#	3.3E–09	2.0E-09	4.0E-08	1.5E–11	0.0	8.9	17.9	3599.9	13.42
370.47	375.47	5.45E-08	4.50E-08	2	WBS2	5.2E-08	NN#	3.7E-07	NN#	5.2E-08	3.0E-08	9.0E-08	1.2E–11	0.4	0.9	5.7	3647.1	13.25
375.47	380.47	2.78E–07	2.29E-07	2	WBS2	2.3E-07	NN#	1.0E-06	NN#	2.3E-07	9.0E-08	4.0E-07	7.1E–11	-1.3	1.0	15.5	3693.3	12.98
380.47	385.47	1.59E–08	1.32E–08	2	WBS2	2.1E–08	NN#	7.0E-08	NN#	2.1E–08	9.0E09	4.0E-08	3.3E-11	2.8	3.3	16.2	3744.8	13.25

	su	\mathbf{h}_{wif}	masl	∧N#	∧N#	∧N#	13.58	13.48	13.13	13.30	∧N#	NN#	13.87	∧N#	13.45	∧N#	11.40	∧N#	13.53	12.68	NN#	NN#	13.71	∧N#	14.38
	Static conditio	*a	kPa	NN#	NN#	NN#	3943.5	3991.4	4036.9	4087.5	NN#	NN#	4239.7	NN#	4333.1	NN#	4410.7	NN#	4529.4	4570.0	NN#	NN#	4726.6	NN#	5026.6
		dt_2	min	NN#	NN#	∧N#	16.6	16.6	10.9	12.5	6.2	NN#	NN#	NN#	0.8	36.5	NN#	26.8	NN#	NN#	NN#	NN#	1.7	NN#	1.2
		dt,	min	NN#	NN#	NN#	11.5	12.4	3.7	3.2	0.7	NN#	NN#	NN#	0.2	23.8	NN#	16.1	NN#	NN#	NN#	NN#	0.5	NN#	0.2
		ŝ	ı	2.4	0.8	NN#	0.0	0.0	0.0	31.3	3.6	2.6	15.9	NN#	0.0	1.0	1.4	1.1	15.9	2.1	NN#	NN#	10.6	NN#	4.3
		υ	m³/Pa	8.5E-12	2.0E-11	NN#	1.1E–11	1.4E–11	1.5E–11	6.1E-10	6.3E-12	7.9E–13	1.4E–11	NN#	1.9E–11	8.9E–12	6.3E-11	4.9E–11	1.4E–11	1.6E–10	∧N#	∧N#	1.3E–11	NN#	1.6E–10
		T _{TMAX}	m²/s	5.0E-11	4.0E-10	1.0E-10	4.0E-08	8.0E-09	3.0E-09	5.0E-06	3.0E-10	7.0E-11	3.0E-08	1.0E-13	8.0E-08	1.0E-11	4.0E-09	3.0E-10	4.0E-09	7.0E-09	1.0E-13	1.0E-13	4.0E-07	1.0E-13	5.0E-06
		T _{TMIN}	m²/s	7.0E-12	7.0E-11	1.0E–12	7.0E-09	2.0E-09	8.0E-09	7.0E-07	5.0E-11	8.0E-12	5.0E-09	1.0E–11	1.0E-08	1.0E–12	8.0E-10	3.0E-11	6.0E-10	7.0E-10	1.0E-11	1.0E–11	7.0E-08	1.0E–11	9.0E-07
		ц,	m²/s	8.3E-12	8.7E–11	1.0E–10	1.5E-08	6.7E-09	9.3E-10	2.4E–06	7.9E–11	1.2E–11	1.2E–08	1.0E–11	4.0E-08	8.4E–12	1.6E–09	1.3E–10	3.1E-09	6.2E-09	1.0E-11	1.0E–11	1.1E-07	1.0E–11	2.4E–06
		T_{s_2}	m²/s	2.1E–11	1.6E–10	NN#	NN#	NN#	NN#	NN#	1.6E–10	3.6E–11	NN#	NN#	4.2E07	4.5E-12	NN#	0 7.0E-11	NN#	NN#	NN#	NN#	NN#	NN#	1.8E–05
	ers	T _{s,}	m²/s	8.3E-12	8.7E-11	NN#	8.1E-08	5.7E-08	7.2E-09	2.4E–06	7.9E–11	1.2E–11	1.2E–08	NN#	8.3E-08	8.4E–12	1.6E–09	1.3E-01(3.1E-09	6.2E-09	NN#	NN#	1.8E–07	NN#	2.4E–06
	n paramet	Т ²²	m²/s	NN#	NN#	NN#	1.1E-08	3.8E-09	NN#	1.4E–06	NN#	NN#	NN#	NN#	7.9E–08	NN#	NN#	NN#	2.4E–10	1.5E–09	NN#	NN#	3.7E-08	NN#	4.3E-06
0	Formatio	/ Т ₁₁	m²/s	NN#	NN#	NN#	1.5E-08	6.7E-09	9.3E-10	3.8E-07	NN#	NN#	3.8E-09	NN#	4.0E-08	NN#	1.3E-09	NN#	4.9E–10	7.3E-10	NN#	NN#	1.1E-07	NN#	1.2E–06
ent analysis	gime	Recovery phase		WBS22	WBS22	NN#	WBS2	WBS2	WBS2	WBS2	WBS22	WBS22	WBS2	NN#	WBS22	WBS22	WBS2	WBS22	WBS2	WBS2	NN#	NN#	WBS2	NN#	WBS22
Transie	Flow re	Perturt phase		NN#	NN#	NN#	22	22	2	22	NN#	NN#	7	NN#	22	NN#	2	NN#	22	22	NN#	NN#	22	NN#	22
flow		Ť	m²/s	NN#	NN#	NN#	1.40E-08	6.72E-09	1.24E–09	3.10E-07	NN#	NN#	2.55E-09	NN#	3.97E–08	NN#	1.69E–09	NN#	3.68E-10	4.01E-09	NN#	NN#	3.17E-08	NN#	1.07E-06
Stationary parameters		Q/s	m²/s	NN#	NN#	NN#	1.70E-08	8.14E–09	1.51E-09	3.76E-07	NN#	NN#	3.08E-09	NN#	4.80E-08	NN#	2.04E-09	NN#	4.46E-10	4.85E-09	NN#	NN#	3.84E-08	NN#	1.30E-06
oosition		low	m btoc	390.47	395.48	400.48	405.48	410.49	415.50	420.51	425.51	430.51	435.51	440.50	445.50	450.50	455.50	460.50	465.51	470.52	475.52	480.52	485.52	510.55	515.56
Interval		dn	m btoc	385.47	390.48	395.48	400.48	405.49	410.50	415.51	420.51	425.51	430.51	435.50	440.50	445.50	450.50	455.50	460.51	465.52	470.52	475.52	480.52	505.55	510.56

Interval	position	Stationary parameter:	flow s	Transier	ıt analysis													
				Flow rec	jime	Formatior	n paramete	S									Static condition	ß
dn	low	Q/s	⊾	Perturb phase	Recovery phase	ц Н	Т ²	Hs,	T_{s_2}	ŕ	T _{TMIN}	T _{TMAX}	с	س	dt,	dt_2	* 0 .	h _{wif}
m btoc	m btoc	m²/s	m²/s			m²/s	m²/s	m²/s	m²/s	m²/s	m²/s	m²/s	m³/Pa	-	nin	nin	кРа	masl
515.56	520.56	2.99E-08	2.47E-08	22	WBS2	4.5E-08	2.4E-08	2.1E-07	NN#	4.5E-08	9.0E-09	5.0E-08	1.8E–11	2.6	15.2	18.8	5077.1	14.55
520.57	525.57	2.71E-07	2.24E-07	22	WBS2	2.7E-07	5.4E-07	1.3E-06	NN#	2.7E–07	9.0E08	5.0E-07	3.3E-11	0.0	0.6	1.2	5125.2	14.46
545.62	550.62	NN#	NN#	NN#	NN#	NN#	NN#	NN#	NN#	1.0E11	1.0E–11	1.0E-13	NN#	NN#	NN#	NN#	NN≄	NN#
550.62	555.62	1.68E–09	1.39E–09	22	WBS2	1.4E–09	5.4E-10	2.8E-09	NN#	2.8E-09	7.0E-10	4.0E-09	1.8E–11	5.4	NN#	NN#	5409.3	13.51
555.63	560.63	7.27E-10	6.00E-10	2	WBS2	4.6E–10	NN#	1.3E-09	NN#	1.3E–09	5.0E-10	3.0E-09	1.7E–11	5.5	NN#	NN#	5449.0	12.57
560.63	565.63	3.11E-10	2.56E-10	22	WBS2	2.6E–10	6.5E-11	1.2E–09	NN#	1.2E–09	1.0E–10	2.0E09	1.1E–11	10.3	NN#	NN#	5507.0	13.50
565.64	570.64	2.13E-07	1.76E–07	2	WBS2	5.8E-07	NN#	7.1E-07	NN#	5.8E-07	3.0E-07	6.0E07	1.4E–10	10.5	1.5	19.7	5558.4	13.75
570.64	575.64	6.66E-08	5.50E-08	22	WBS2	1.7E-07	1.0E-07	4.3E-07	NN#	1.7E-07	7.0E-08	4.0E07	2.0E-11	8.6	0.5	4.	5609.7	14.00
575.65	580.65	3.12E-07	2.58E–07	2	WBS2	9.0E-07	NN#	1.0E-06	NN#	9.0E07	6.0E07	2.0E-06	6.4E-10	10.9	0.9	14.8	5658.4	13.98
580.65	585.65	2.51E-07	2.07E-07	2	WBS2	3.3E-07	NN#	8.6E–07	NN#	3.3E-07	8.0E-08	6.0E-07	6.6E-10	1.6	0.4	5.4	5711.9	14.46
585.67	590.67	1.23E–07	1.01E-07	22	WBS2	2.2E-07	3.9E-08	6.1E-07	NN#	2.2E-07	8.0E-08	5.0E-07	1.7E–11	с	0.1	2.1	5762.3	14.60
590.67	595.67	5.37E-09	4.44E-09	22	WBS2	6.1E-09	1.5E–09	4.4E08	NN#	6.1E-09	1.0E-09	9.0E09	1.7E–11	0	NN#	NN#	5811.9	14.68
595.69	69.009	NN#	NN#	NN#	∧N#	NN#	NN#	NN#	NN#	1.0E–11	1.0E–11	1.0E-13	NN#	NN#	NN#	NN#	^N¢	NN#
600.69	605.69	7.89E–07	6.51E-07	2	WBS22	9.2E-07	NN#	1.3E-06	2.0E06	9.2E-07	7.0E-07	3.0E06	8.4E-10	0.0	2.8	16.5	5907.7	14.47
605.69	610.69	2.15E–07	1.78E–07	22	WBS2	2.9E–07	5.6E-07	1.0E-06	NN#	2.9E–07	1.0E-07	7.0E-07	2.7E–11	1.8	0.8	2.3	5956.1	14.43
610.70	615.70	1.02E-07	8.41E-08	2	WBS2	2.6E–07	NN#	4.4E-07	NN#	2.6E–07	9.0E08	6.0E-07	6.0E-11	9.5	2.0	8.9	3003.1	14.24
615.70	620.70	7.12E-07	5.88E-07	2	WBS2	1.7E–06	NN#	4.4E-06	NN#	1.7E–06	6.0E-07	4.0E-06	1.5E-10	7.7	1.0	7.6	3050.3	14.07
620.71	625.71	4.03E-07	3.32E-07	7	WBS2	5.5E-07	NN#	2.7E-06	NN#	5.5E-07	2.0E-07	9.0E07	4.5E–11	1.5	10.6	16.6	3096.4	13.79
625.71	630.71	1.44E–06	1.19E–06	7	WBS2	3.1E-06	NN#	3.3E-06	NN#	3.1E–06	9.0E07	6.0E06	2.0E-10	5.9	3.7	12.3	3145.4	13.81
630.72	635.72	NN#	NN#	NN#	NN#	NN#	NN#	NN#	NN#	1.0E–11	1.0E–11	1.0E-13	NN#	NN#	NN#	NN#	NN≄	NN#
635.72	640.72	NN#	NN#	NN#	NN#	NN#	NN#	NN#	NN#	1.0E–11	1.0E–11	1.0E–13	NN#	NN#	NN#	NN#	NN#	NN#
640.73	645.73	NN#	NN#	NN#	NN#	NN#	NN#	NN#	NN#	1.0E–11	1.0E–11	1.0E-13	NN#	NN#	NN#	NN#	NN≄	NN#

Interval	position	Stationary parameters	flow	Transier	nt analysis													
				Flow reç	gime.	Formatio	n paramet	ters									Static condition	S
dn	low	Q/s	Ψ	Perturb phase	Recovery phase	T ₁₄	T ₁₂	T _s ,	T_{s_2}	Ļ	\mathbf{T}_{TMIN}	T _{TMAX}	υ	ŝ	dt,	dt_2	*d	h _{wif}
m btoc	m btoc	m²/s	m²/s		-	m²/s	m²/s	m²/s	m²/s	m²/s	m²/s	m²/s	m³/Pa	ı	min	min	kPa	masl
645.73	650.73	3.08E-09	2.55E-09	2	WBS2	2.8E-09	NN#	6.9E-09	NN#	2.8E-09	7.0E-10	5.0E-09	1.4E–11	1.9	0.9	10.3	6343.5	14.08
650.74	655.74	2.40E–10	1.98E-10	2	WBS2	1.6E–10	NN#	2.0E-10	NN#	2.0E-10	8.0E-11	6.0E-10	6.2E-12	1.4	NN#	NN#	6387.2	13.55
655.75	660.75	1.64E–10	1.36E-10	2	WBS2	8.7E-11	NN#	2.1E-10	NN#	2.1E–10	7.0E–11	6.0E-10	4.7E-12	4.2	NN#	NN#	6441.5	14.10
660.75	665.75	NN#	NN#	NN#	NN#	NN#	NN#	NN#	NN#	1.0E–11	1.0E–11	1.0E-13	NN#	NN#	NN#	NN#	NN#	NN#
665.76	670.76	7.93E-08	6.55E-08	2	WBS2	9.2E-08	NN#	1.9E–07	NN#	1.9E–07	8.0E-08	5.0E-07	2.1E–11	8.0	0.6	17.1	6538.7	14.05
670.76	675.76	1.12E-07	9.22E-08	2	WBS22	1.2E-07	NN#	1.6E-07	9.0E-08	1.6E–07	8.0E-08	4.0E-08	1.4E–11	0.9	0.2	0.4	6591.1	14.42
675.77	680.77	NN#	NN#	NN#	WBS22	NN#	NN#	2.7E-10	3.8E-10	2.7E–10	8.0E-11	6.0E-10	8.4E-12	3.8	0.6	6.9	NN#	NN#
680.78	685.78	NN#	NN#	NN#	WBS22	NN#	NN#	3.1E-09	1.4E-09	3.1E-09	5.0E-10	5.0E-09	2.3E-11	6.1	0.6	5.2	NN#	NN#
Notes																		

1 T1 and T2 refer to the transmissivity(s) derived□ reported, in case a two zones composite model was recommended both T1 and T2 are given T_T denotes the recommended transmissivity.

2 The parameter p^* denoted the static formation $p\square$

extrapolation.

3 The flow regime description refers to The recomme□ the flow dimension used in the analysis (1 = linear flow □ was used in the analysis, if two numbers are given (WBS22 or 22) a 2 zones composite model was used.



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

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



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



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

7.2 Correlation analysis

A correlation analysis was used with the aim of examining the consistency of results and deriving general conclusion regarding the testing and analysis methods used.

7.2.1 Comparison of steady state and transient analysis results

The steady state derived transmissivities (T_M and Q/s) were compared in a cross-plot with the recommended transmissivity values derived from the transient analysis (see following figure).

The correlation analysis shows that nearly all of the steady state derived transmissivities differ by less than one order of magnitude from the transmissivities derived from the transient analysis.



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

7.2.2 Comparison between the matched and theoretical wellbore storage coefficient

The wellbore storage coefficient describes the capacity of the test interval to store fluid as result to an unit pressure change in the interval. For a closed system (i.e. closed downhole valve) the theoretical value of the wellbore storage coefficient is given by the product between the interval volume and the test zone compressibility. The interval volume is calculated from the borehole radius and interval length. There are uncertainties concerning the interval volume calculation. Cavities or high transmissivity fractures intersecting the interval may enlarge the effective volume of the interval. The test zone compressibility is given by the sum of compressibilities of the individual components present in the interval (water, packer elements, other test tool components, and the borehole wall). A minimum value for the test zone compressibility is given by the water compressibility which is approx. 5E–10 1/Pa. For the calculation of the theoretical wellbore storage coefficient a test zone compressibility of 7E–10 1/Pa was used. The matched wellbore storage coefficient is derived from the transient type curve analysis by matching the unit slope early times derivative plotted in log-log coordinates.

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



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

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

In addition, the observed large skin factor and large borehole coefficients is described in /Spivey et al, 2002/ and explained by turbulent flow taking place in the formation (i.e. along fractures). The possible occurrence of this phenomenom could be examined by applying an adapted test design, for example by using step tests conducted at different pressure levels.

8 Conclusions

8.1 Transmissivity

Figure 7-1 presents a profile of transmissivity, including the confidence ranges derived from the transient analysis. The method used for deriving the recommended transmissivity and its confidence range is described in Section 5.5.7.

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

In some cases, no injection test could be performed due to the fact that the flow rates during the CHi phase were below the range of the flowmeter (< 0.5 mL/min). In such cases a pulse injection (Pi) was performed alternatively. Altogether 12 Pulse injection tests were performed and the recommended transmissivities of these sections range between $4.5\text{E}-12 \text{ m}^2/\text{s}$ and $3.1\text{E}-9 \text{ m}^2/\text{s}$. Recommended transmissivities of the injection tests range between $1.0\text{E}-9 \text{ m}^2/\text{s}$ and $2.0\text{E}-4 \text{ m}^2/\text{s}$.

The transmissivity profile in Figure 7-1 shows for the 100 m sections from 105 to 705 m transmissivities of 1E–6 m²/s to 2E–4 m²/s. The lowest transmissivity of the 100 m sections is 4E–10 m²/s from 705–805 m. For the two sections below, transmissivities of 4.3E–8 and 8.2E–7 were derived. For the 20 m sections, the transmissivities range from 1E–9 m²/s to 1E–4 m²/s. The highest transmissivities were derived in the sections between 105 and 305 m. Between 305 and 705 m the values range typically between 1E–9 and 1E–6 m²/s. 5 m sections were tested between 305 and 705 m. The highest transmissivity of 1.5E–5 m²/s was derived from the test in section 350–355 m. In most of the cases the transmissivity is lower than 1E–6 m²/s. Most of the lowest conductive sections are situated between 400 and 550 m and between 650 and 700 m.

Only one 20 m section (405–425 m) and some 5 m sections show larger transmissivities than the appropriate longer interval. The difference is not very large. This can be explained with crossflow and connection to the zone above. A connection to the upper zone is very hard to detect.

8.2 Equivalent freshwater head

Figure 7-1 presents a profile of the derived equivalent freshwater head expressed in meters above sea level. The method used for deriving the equivalent freshwater head is described in Section 5.5.6.

The head profile shows a freshwater head for the zone between 105 and 505 m depth between 13.0 and 14.0 m asl. Down to 900 m, the freshwater head increases continuously by less than 0.5 m per 100 m depth. This can be explained by a higher salinity of the water down from ca 500 m. The profile shows no distinct zones, which means that there is a good vertical connectivity in the formation around the borehole.

8.3 Flow regimes encountered

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

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

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

In few cases very large skins has been observed. This is unusual and should be further examined. There are several possible explanations to this behaviour:

- If the behaviour is to be completely attributed to changes of transmissivity in the formation, this indicates the presence of larger transmissivity zones in the borehole vicinity, which could be caused by steep fractures that do not intersect the test interval, but are connected to the interval by lower transmissivity fractures. The fact that in many cases the test derivatives of adjacent test sections converge at late times seems to support this hypothesis.
- A further possibility is that the large skins are caused by turbulent flow taking place in the tool or in fractures connected to the test interval. This hypothesis is more difficult to examine. However, considering the fact that some high skins were observed in sections with transmissivities as low as 1E–8 m²/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 some cases an alternative analysis with a flow dimension unequal to two was performed. Those analyses are presented in Appendix 2.

9 References

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Borehole: KLX04

APPENDIX 1

File Description Table

HYDRO WITH P	TES SS	ΓING			DRI	ILLHOLE IDENTIFICATION NO).: KLX0	4			
TEST- AND FILEPROTOCOL					Testorder dated : 2004-08-18						
Teststart	T.	Interval boundari	es		Na	me of Datafiles	Testtype	Copied to	Plotted (date)	Sign.	
2004-08-20	10:27	105.11	205.11	KLX04_0105.21_20040820095	59.ht2	(*.CSV-file) KLX04_105.11-205.11_040820_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-21		
2004-08-20	14:50	205.34	305.34	KLX04_0205.34_20040820145	50.ht2	KLX04_205.34-305.34_040820_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-21		
2004-08-20	16:11	205.34	305.34	KLX04_0205.34_20040820161	1.ht2	KLX04_205.34-305.34_040820_2_CHir_Q_r.csv	CHir	2004-09-08	2004-08-21		
2004-08-21	08:14	305.41 405.49	405.41 505.49	KLX04_0305.41_20040821081 KLX04_0405.49_20040821114	4.ht2 8.ht2	KLX04_305.41-405.41_040821_1_CHir_Q_r.csv KLX04_405.49-505.49_040821_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-21		
2004-08-21	14:57	505.55	605.55	KLX04_0505.55_20040821145	57.ht2	KLX04_505.55-605.55_040821_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-21		
2004-08-22	08:12	605.69	705.69	KLX04_0605.69_20040822081	2.ht2	KLX04_605.69-705.69_040822_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-22		
2004-08-22	11:37	705.81	805.81	KLX04_0705.81_20040822113	7.ht2	KLX04_705.81-805.81_040822_1_Pi_Q_r.csv	Pi	2004-09-08	2004-08-22		
2004-08-22 2004-08-23	15:17 08:00	805.98 886.11	905.98 986.11	KLX04_0805.98_20040822151 KLX04_0886.11_20040823080	7.ht2 00.ht2	KLX04_805.98-905.98_040822_1_CHir_Q_r.csv KLX04_886.11-986.11_040823_1_CHir_Q_r.csv	CHir CHir	2004-09-08 2004-09-08	2004-08-22 2004-08-23		
2004-08-24	07:29	105.21	125.21	KLX04_0105.21_20040824072	.9.ht2	KLX04_105.21-125.21_040824_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-24		
2004-08-24	09:54	125.25	145.25	KLX04_0125.25_20040824095	54.ht2	KLX04_125.25-145.25_040824_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-24		
2004-08-24	21:02	145.30	165.30	KLX04_0145.30_20040824210	02.ht2	KLX04_145.30-165.30_040824_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-25		
2004-08-24	23:44	165.30	185.30	KLX04_0165.30_20040824234	4.ht2	KLX04_165.30-185.30_040824_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-25		
2004-08-25	06:35	185.32	205.32	KLX04_0185.32_20040825063	5.ht2	KLX04_185.32-205.32_040825_1_Chir_Q_r.csv	CHir	2004-09-08	2004-08-25	 	
2004-08-25	08.49	205 34	225 34	KLX04 0205 34 20040825084	9.ht2	KLX04 205 34-225 34 040825 1 CHir O r csv	CHir	2004-09-08	2004-08-25		

HYDRO WITH P	TES SS	ΓING		Ι	DRI	LLHOLE IDENTIFICATION NO).: KLX0	4			
TEST- AND					Testorder dated : 2004-08-18						
Teststart		Interval boundari	es		Name of Datafiles		Testtype	Copied to	Plotted	Sign.	
Date	Time	Upper	Lower	(*.HT2-file)		(*.CSV-file)		disk/CD	(date)		
2004-08-25	11:23	225.35	245.35	KLX04_0225.35_200408251123	3.ht2	KLX04_225.35-245.35_040825_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-25		
2004-08-25	14:50	242.38	262.38	KLX04_0242.38_200408251450	0.ht2	KLX04_242.38-262.38_040825_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-25		
2004-08-25	17:17	262.38	282.38	KLX04_0262.38_200408251717	7.ht2	KLX04_262.38-282.38_040825_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-25		
2004-08-25	21:17	285.40	305.40	KLX04_0285.40_200408252117	7.ht2	KLX04_285.40-305.40_040825_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-25		
2004-08-25	22:12	285.40	305.40	KLX04_0285.40_200408252212	2.ht2	KLX04_285.40-305.40_040825_2_CHir_Q_r.csv	CHir	2004-09-08	2004-09-06		
2004-08-26	02:27	305.41	325.41	KLX04_0305.41_200408260227	7.ht2	KLX04_305.41-325.41_040826_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-26		
2004-08-26	06:31	325.44	345.44	KLX04_0325.44_200408260631	1.ht2	KLX04_325.44-345.44_040826_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-26		
2004-08-26	08:33	345.44	365.44	KLX04_0345.44_200408260837	7.ht2	KLX04_345.44-365.44_040826_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-26		
2004-08-26	10:35	365.47	385.47	KLX04_0365.47_200408261038	8.ht2	KLX04_365.47-385.47_040826_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-26		
2004-08-26	14:00	385.47	405.47	KLX04_0385.47_200408261400	0.ht2	KLX04_385.47-405.47_040826_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-26		
2004-08-26	16:37	405.49	425.49	KLX04_0405.49_200408261637	7.ht2	KLX04_405.49-425.49_040826_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-26		
2004-08-26	19:32	425.51	445.51	KLX04_0425.51_200408261932	2.ht2	KLX04_425.51-445.51_040826_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-26		
2004-08-26	22:10	445.50	465.50	KLX04_0445.50_200408262210	0.ht2	KLX04_445.50-465.50_040826_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-26		
2004-08-27	00:32	465.52	485.52	KLX04_0465.52_200408262210	0.ht2	KLX04_465.52-485.52_040826_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-27		
2004-08-27	06:37	485.52	505.52	KLX04_0485.52_200408270637	7.ht2	KLX04_485.52-505.52_040827_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-27		
2004-08-27	09:08	505.55	525.55	KLX04 0505.55 200408270911	1.ht2	KLX04 505.55-525.55 040827 1 CHir Q r.csv	CHir	2004-09-08	2004-08-27		

HYDRO WITH P	TES SS	ΓING		D	DRI	LLHOLE IDENTIFICATION NO).: KLX0	4			
TEST- AND					Testorder dated : 2004-08-18						
FILEPR	010	COL									
Teststart		boundari	es		Nan	ne of Datafiles	Testtype	Copied to	Plotted	Sign.	
Date	Time	Upper	Lower	(*.HT2-file)		(*.CSV-file)		disk/CD	(date)		
2004-08-27	11:12	525.58	545.58	KLX04_0525.58_200408271114.	l.ht2	KLX04_525.58-545.58_040827_1_Pi_Q_r.csv	Pi	2004-09-08	2004-08-27		
2004-08-27	14:59	545.62	565.62	KLX04_0545.62_200408271459.).ht2	KLX04_545.62-565.62_040827_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-27		
2004-08-27	19:34	545.62	565.62	KLX04_0545.62_200408271934.	l.ht2	KLX04_545.62-565.62_040827_2_CHir_Q_r.csv	CHir	2004-09-08	2004-08-27		
2004-08-27	21:41	565.64	585.64	KLX04_0565.64_200408272141.	.ht2	KLX04_565.64-585.64_040827_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-27		
2004-08-28	00:07	585.65	605.65	KLX04_0585.65_200408280007.	7.ht2	KLX04_585.65-605.65_040828_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-28		
2004-08-28	02:17	605.69	625.69	KLX04_0605.69_200408280217.	7.ht2	KLX04_605.69-625.69_040828_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-28		
2004-08-28	06:37	625.71	645.71	KLX04_0625.71_200408280637.	7.ht2	KLX04_625.71-645.71_040828_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-28		
2004-08-28	08:45	645.73	665.73	KLX04_0645.73_200408280845.	5.ht2	KLX04_645.73-665.73_040828_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-28		
2004-08-28	10:47	665.76	685.76	KLX04_0665.76_200408281047.	7.ht2	KLX04_665.76-685.76_040828_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-28		
2004-08-28	13:37	685.79	705.79	KLX04_0685.79_200408281337.	7.ht2	KLX04_685.79-705.79_040828_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-28		
2004-08-28	17:59	805.98	825.98	KLX04_0805.98_200408281759.).ht2	KLX04_805.98-825.98_040828_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-28		
2004-08-28	20:06	826.02	846.02	KLX04_0826.02_200408282006.	5.ht2	KLX04_826.02-846.02_040828_1_Pi_Q_r.csv	Pi	2004-09-08	2004-08-28		
2004-08-28	22:55	846.05	866.05	KLX04_0846.05_200408282255.	5.ht2	KLX04_846.05-866.05_040828_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-29		
2004-08-29	00:49	866.08	886.08	KLX04_0866.08_200408290049.).ht2	KLX04_866.08-886.08_040829_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-29		
2004-08-29	03:05	886.11	906.11	KLX04_0886.11_200408290305.	5.ht2	KLX04_886.11-906.11_040829_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-29		
2004-08-30	05:53	225.35	245.35	KLX04 0225.35 200408300553.	3.ht2	KLX04 225.35-245.35 040830 1 CHir O r.csv	CHir	2004-09-08	2004-08-30		

HYDRO	TES	ГING			חחח	ΤΙ ΠΟΙ Ε ΙΝΕΝΤΙΕΙΟΑ ΤΙΟΝ ΝΟ	. 1/1 VA	4				
	<u>55</u>			I	DRILLHOLE IDENTIFICATION NO.: KLX04							
I LOI - AND FIL EDDOTOCOL					Testorder dated : 2004-08-18							
FILEPK	010	Interval										
Teststart		boundari	es		Na	me of Datafiles	Testtype	Copied to	Plotted	Sign.		
Date	Time	Upper	Lower	(*.HT2-file)		(*.CSV-file)		disk/CD	(date)			
2004-08-30	07:53	245.38	265.38	KLX04_0245.38_200408300753	3.ht2	KLX04_245.38-265.38_040830_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-30			
2004-08-30	09:53	265.38	285.38	KLX04_0265.38_200408300953	3.ht2	KLX04_265.38-285.38_040830_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-30			
2004-08-30	16:11	445.50	465.50	KLX04_0445.50_200408301611	1.ht2	KLX04_445.50-465.50_040830_2_CHir_Q_r.csv	CHir	2004-09-08	2004-08-30			
2004-08-31	01:49	886.11	906.11	KLX04_0886.11_200408310149	9.ht2	KLX04_886.11-906.11_040831_2_CHir_Q_r.csv	CHir	2004-09-08	2004-08-31			
2004-08-31	06:18	906.16	926.16	KLX04_0906.16_200408310618	8.ht2	KLX04_906.16-926.16_040831_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-31			
2004-08-31	08:16	926.18	946.18	KLX04_0926.18_200408310816	6.ht2	KLX04_926.18-946.18_040831_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-31			
2004-08-31	10:30	943.05	963.05	KLX04_0943.05_200408311030	0.ht2	KLX04_943.05-963.05_040831_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-31			
2004-08-31	12:54	963.05	983.05	KLX04_0963.05_200408311254	4.ht2	KLX04_963.05-983.05_040831_1_CHir_Q_r.csv	CHir	2004-09-08	2004-08-31			
2004-09-01	10:29	300.41	305.41	KLX04_0300.41_200409011029	9.ht2	KLX04_300.41-305.41_040901_1_CHir_Q_r.csv	CHir	2004-09-08	2004-09-01			
2004-09-01	13:06	305.41	310.41	KLX04_0305.41_200409011306	6.ht2	KLX04_305.41-310.41_040901_1_CHir_Q_r.csv	-	2004-09-08	2004-09-01			
2004-09-01	14:43	310.42	315.42	KLX04_0310.42_200409011443	3.ht2	KLX04_310.42-315.42_040901_1_CHir_Q_r.csv	CHir	2004-09-08	2004-09-01			
2004-09-01	16:25	315.43	320.43	KLX04_0315.43_200409011625	5.ht2	KLX04_315.43-320.43_040901_1_CHir_Q_r.csv	CHir	2004-09-08	2004-09-01			
2004-09-01	18:55	320.43	325.34	KLX04_0320.43_200409011855	5.ht2	KLX04_320.43-325.43_040901_1_CHir_Q_r.csv	CHir	2004-09-08	2004-09-01			
2004-09-01	23:17	325.44	330.44	KLX04_0325.44_200409012317	7.ht2	KLX04_325.44-330.44_040901_1_CHir_Q_r.csv	CHir	2004-09-08	2004-09-02			
2004-09-02	05:51	330.44	335.44	KLX04_0330.44_200409020551	1.ht2	KLX04_330.44-335.44_040902_1_CHir_Q_r.csv	CHir	2004-09-08	2004-09-02			
2004-09-02	07:47	335.44	340.44	KLX04 0335.44 200409020747	7.ht2	KLX04 335.44-340.44 040902 1 CHir O r.csv	CHir	2004-09-08	2004-09-02			

HYDRO	TES	ΓING		-							
WITH P	SS			D	DRILLHOLE IDENTIFICATION NO.: KLX04						
TEST- A	ND			Т	Testarder dated · 2004 08 18						
FILEPROTOCOL											
Teststart		Interval boundari	es		Name of Datafiles		Testtype	Copied to	Plotted	Sign.	
Date	Time	Upper	Lower	(*.HT2-file)	(*.CSV-file))		disk/CD	(date)		
2004-09-02	09:24	340.44	345.44	KLX04_0340.44_200409020924.1	t2 KLX04_340.44-345.44_040902	2_1_CHir_Q_r.csv	CHir	2004-09-08	2004-09-02		
2004-09-02	11:09	345.44	350.44	KLX04_0345.44_200409021109.1	t2 KLX04_345.44-350.44_040902	2_1_CHir_Q_r.csv	CHir	2004-09-08	2004-09-02		
2004-09-02	13:20	350.45	355.45	KLX04_0350.45_200409021320.1	t2 KLX04_350.45-355.45_040902	2_1_CHir_Q_r.csv	CHir	2004-09-08	2004-09-02		
2004-09-02	15:14	355.47	360.47	KLX04_0355.47_200409021514.1	t2 KLX04_355.47-360.47_040902	2_1_CHir_Q_r.csv	CHir	2004-09-08	2004-09-02		
2004-09-02	16:57	360.47	365.47	KLX04_0360.47_200409021657.1	t2 KLX04_360.47-365.47_040902	2_1_CHir_Q_r.csv	CHir	2004-09-08	2004-09-02		
2004-09-02	20:18	375.47	370.47	KLX04_0365.47_200409022018.1	t2 KLX04_365.47-370.47_040902	2_1_CHir_Q_r.csv	CHir	2004-09-08	2004-09-02		
2004-09-02	22:36	370.47	375.47	KLX04_0370.47_200409022236.1	t2 KLX04_370.47-375.47_040902	2_1_CHir_Q_r.csv	CHir	2004-09-08	2004-09-03		
2004-09-03	05:55	375.47	380.47	KLX04_0375.47_200409030555.1	t2 KLX04_375.47-380.47_040903	3_1_CHir_Q_r.csv	CHir	2004-09-08	2004-09-03		
2004-09-03	07:31	380.47	385.47	KLX04_0380.47_200409030731.1	t2 KLX04_380.47-385.47_040903	3_1_CHir_Q_r.csv	CHir	2004-09-08	2004-09-03		
2004-09-03	09:25	385.47	390.47	KLX04_0385.47_200409030925.1	t2 KLX04_385.47-390.47_040903	3_1_PI_Q_r.csv	Pi	2004-09-08	2004-09-03		
2004-09-03	12:21	390.48	395.48	KLX04_0390.48_200409031221.1	t2 KLX04_390.48-395.48_040903	3_1_PI_Q_r.csv	Pi	2004-09-08	2004-09-03		
2004-09-03	14:09	395.48	400.48	KLX04_0395.48_200409031409.1	t2 KLX04_395.48-400.48_040903	3_1_PI_Q_r.csv	Pi	2004-09-08	2004-09-03		
2004-09-03	16:10	400.48	405.48	KLX04_0400.48_200409031610.1	t2 KLX04_400.48-405.48_040903	3_1_Chir_Q_r.csv	CHir	2004-09-08	2004-09-03		
2004-09-03	18:30	405.49	410.49	KLX04_0405.49_200409031830.1	t2 KLX04_405.49-410.49_040903	3_1_Chir_Q_r.csv	CHir	2004-09-08	2004-09-03		
2004-09-03	21:22	410.50	415.50	KLX04_0410.50_200409032122.1	t2 KLX04_410.50-415.50_040903	3_1_Chir_Q_r.csv	CHir	2004-09-08	2004-09-03		
2004-09-03	23:33	415.51	420.51	KLX04 0415.51 200409032333.	t2 KLX04 415.51-420.51 040903	3 1 Chir O r.csv	CHir	2004-09-08	2004-09-04		

HYDRO	TES	TING										
WITH P	SS			Ι	DRILLHOLE IDENTIFICATION NO.: KLX04							
TEST- A	ND			1	Testardar datad · 2004 08 18							
FILEPR	FILEPROTOCOL Testorder dated : 2004-08-18											
Teststart		Interval boundari	es		Nai	me of Datafiles	Testtype	Copied to	Plotted	Sign.		
Date	Time	Upper	Lower	(*.HT2-file)		(*.CSV-file)		disk/CD	(date)			
2004-09-04	06:01	420.51	425.51	KLX04_0420.51_200409040601	l.ht2	KLX04_420.51-425.51_040904_1_Pi_Q_r.csv	Pi	2004-09-08	2004-09-04			
2004-09-04	07:55	425.51	430.51	KLX04_0425.51_200409040755	5.ht2	KLX04_425.51-430.51_040904_1_Pi_Q_r.csv	Pi	2004-09-08	2004-09-04			
2004-09-04	09:37	430.51	435.51	KLX04_0430.51_200409040937	7.ht2	KLX04_430.51-435.51_040904_1_CHir_Q_r.csv	CHir	2004-09-08	2004-09-04			
2004-09-04	12:31	435.50	440.50	KLX04_0435.50_200409041231	l.ht2	KLX04_435.50-440.50_040904_1_CHir_Q_r.csv	-	2004-09-08	2004-09-04			
2004-09-04	14:00	440.50	445.50	KLX04_0440.50_200409041400).ht2	KLX04_440.50-445.50_040904_1_CHir_Q_r.csv	CHir	2004-09-08	2004-09-04			
2004-09-04	15:38	445.50	450.50	KLX04_0445.50_200409041538	3.ht2	KLX04_445.50-450.50_040904_1_Pi_Q_r.csv	Pi	2004-09-08	2004-09-04			
2004-09-04	18:04	450.50	455.50	KLX04_0450.50_200409041804	4.ht2	KLX04_450.50-455.50_040904_1_Chir_Q_r.csv	CHir	2004-09-08	2004-09-04			
2004-09-04	20:00	455.50	460.50	KLX04_0455.50_200409042000).ht2	KLX04_455.50-460.50_040904_1_Pi_Q_r.csv	Pi	2004-09-08	2004-09-04			
2004-09-04	23:06	460.51	465.51	KLX04_0460.51_200409042306	5.ht2	KLX04_460.51-465.51_040904_1_Chir_Q_r.csv	Chir	2004-09-08	2004-09-05			
2004-09-05	01:14	465.52	470.52	KLX04_0465.52_200409050114	4.ht2	KLX04_465.52-470.52_040905_1_Chir_Q_r.csv	Chir	2004-09-08	2004-09-05			
2004-09-05	05:46	470.52	475.52	KLX04_0470.52_200409050546	5.ht2	KLX04_470.52-475.52_040905_1_Chir_Q_r.csv	-	2004-09-08	2004-09-05			
2004-09-05	07:27	475.52	480.52	KLX04_0475.52_200409050727	7.ht2	KLX04_475.52-480.52_040905_1_Chir_Q_r.csv	-	2004-09-08	2004-09-05			
2004-09-05	08:55	480.52	485.52	KLX04_0480.52_200409050857	7.ht2	KLX04_480.52-485.52_040905_1_Chir_Q_r.csv	Chir	2004-09-08	2004-09-05			
2004-09-05	10:34	505.55	510.55	KLX04_0505.55_200409051034	4.ht2	KLX04_505.55-510.55_040905_1_Chir_Q_r.csv	-	2004-09-08	2004-09-05			
2004-09-05	12:46	510.56	515.56	KLX04_0510.56_200409051246	5.ht2	KLX04_510.56-515.56_040905_1_Chir_Q_r.csv	Chir	2004-09-08	2004-09-05			
2004-09-05	14:22	515.56	520.56	KLX04 0515.56 200409051422	2.ht2	KLX04 515 56-520 56 040905 1 Chir O r.csv	Chir	2004-09-08	2004-09-05			

HYDRO	TES	TING										
WITH P	SS			D	DRILLHOLE IDENTIFICATION NO.: KLX04							
TEST- A	ND			Т	Testorder dated · 2004_08_18							
FILEPR	ROTOCOL Testoruer unter 2004-08-18											
Teststart		Interval boundarie	es		Nan	ne of Datafiles	Testtype	Copied to	Plotted	Sign.		
Date	Time	Upper	Lower	(*.HT2-file)		(*.CSV-file)		disk/CD	(date)			
2004-09-05	16:00	520.57	525.57	KLX04_0520.57_200409051600.	.ht2	KLX04_520.57-525.57_040905_1_Chir_Q_r.csv	Chir	2004-09-08	2004-09-05			
2004-09-05	18:17	545.62	550.62	KLX04_0545.62_200409051817.	.ht2	KLX04_545.62-550.62_040905_1_Chir_Q_r.csv	-	2004-09-08	2004-09-05			
2004-09-05	20:03	550.62	555.62	KLX04_0550.62_200409052003.1	.ht2	KLX04_550.62-555.62_040905_1_Chir_Q_r.csv	Chir	2004-09-08	2004-09-05			
2004-09-05	22:32	555.63	560.63	KLX04_0555.63_200409052232.	.ht2	KLX04_555.63-560.63_040905_1_Chir_Q_r.csv	Chir	2004-09-08	2004-09-05			
2004-09-06	00:46	560.63	565.63	KLX04_0560.63_200409060046.	.ht2	KLX04_560.63-565.63_040906_1_Chir_Q_r.csv	Chir	2004-09-08	2004-09-06			
2004-09-06	06:09	565.64	570.64	KLX04_0565.64_200409060609.1	.ht2	KLX04_565.64-570.64_040906_1_Chir_Q_r.csv	Chir	2004-09-08	2004-09-06			
2004-09-06	07:42	570.64	575.64	KLX04_0570.64_200409060742.	.ht2	KLX04_570.64-575.64_040906_1_Chir_Q_r.csv	Chir	2004-09-08	2004-09-06			
2004-09-06	09:15	575.65	580.65	KLX04_0575.65_200409060915.	.ht2	KLX04_575.65-580.65_040906_1_Chir_Q_r.csv	Chir	2004-09-08	2004-09-06			
2004-09-06	10:50	580.65	585.65	KLX04_0580.65_200409061050.	.ht2	KLX04_580.65-585.65_040906_1_Chir_Q_r.csv	Chir	2004-09-08	2004-09-06			
2004-09-06	13:11	585.67	590.67	KLX04_0585.67_200409061311.	.ht2	KLX04_585.67-590.67_040906_1_Chir_Q_r.csv	Chir	2004-09-08	2004-09-06			
2004-09-06	14:45	590.67	595.67	KLX04_0590.67_200409061445.	.ht2	KLX04_590.67-595.67_040906_1_Chir_Q_r.csv	Chir	2004-09-08	2004-09-06			
2004-09-06	16:36	595.69	600.69	KLX04_0595.69_200409061636.	.ht2	KLX04_595.69-600.69_040906_1_Chir_Q_r.csv	-	2004-09-08	2004-09-06			
2004-09-06	18:43	600.69	605.69	KLX04_0600.69_200409061843.	.ht2	KLX04_600.69-605.69_040906_1_Chir_Q_r.csv	Chir	2004-09-08	2004-09-06			
2004-09-06	20:57	605.69	610.69	KLX04_0605.69_200409062057.	.ht2	KLX04_605.69-610.69_040906_1_Chir_Q_r.csv	Chir	2004-09-08	2004-09-06			
2004-09-06	22:41	610.70	615.70	KLX04_0610.70_200409062241.	.ht2	KLX04_610.70-615.70_040906_1_Chir_Q_r.csv	Chir	2004-09-08	2004-09-07			
2004-09-07	00:39	615.70	620.70	KLX04 0615.70 200409070039.	.ht2	KLX04 615.70-620.70 040907 1 Chir O r.csv	Chir	2004-09-08	2004-09-07			

HYDRO	TES	FING									
WITH P	SS			D	DRILLHOLE IDENTIFICATION NO.: KLX04						
TEST- A	ND			Т	Testender detail - 2004 09 19						
FILEPROTOCOL				10	estoruer dated : 2004-08-18						
Teststart		Interval boundari	es		Name of Datafiles	Testtype	Copied to	Plotted	Sign.		
Date	Time	Upper	Lower	(*.HT2-file)	(*.CSV-file)		disk/CD	(date)			
2004-09-07	06:12	625.71	625.71	KLX04_0620.71_200409070612.h	ht2 KLX04_620.71-625.71_040907_1_Chir_Q_r.csv	Chir	2004-09-08	2004-09-07			
2004-09-07	07:41	625.71	630.71	KLX04_0625.71_200409070741.h	nt2 KLX04_625.71-630.71_040907_1_Chir_Q_r.csv	Chir	2004-09-08	2004-09-07			
2004-09-07	09:16	630.72	635.72	KLX04_0630.72_200409070916.h	ht2 KLX04_630.72-635.72_040907_1_Chir_Q_r.csv	-	2004-09-08	2004-09-07			
2004-09-07	10:44	635.72	640.72	KLX04_0635.72_200409071044.h	ht2 KLX04_635.72-640.72_040907_1_Chir_Q_r.csv	-	2004-09-08	2004-09-07			
2004-09-07	12:29	640.73	645.73	KLX04_0640.73_200409071229.h	ht2 KLX04_640.73-645.73_040907_1_Chir_Q_r.csv	-	2004-09-08	2004-09-07			
2004-09-07	14:03	645.73	650.73	KLX04_0645.73_200409071403.h	ht2 KLX04_645.73-650.73_040907_1_Chir_Q_r.csv	Chir	2004-09-08	2004-09-07			
2004-09-07	15:37	650.74	655.74	KLX04_0650.74_200409071537.h	ht2 KLX04_650.74-655.74_040907_1_Chir_Q_r.csv	Chir	2004-09-08	2004-09-07			
2004-09-07	18:16	655.75	660.75	KLX04_0655.75_200409071816.h	nt2 KLX04_655.75-660.75_040907_1_Chir_Q_r.csv	Chir	2004-09-08	2004-09-07			
2004-09-07	22:36	660.75	665.75	KLX04_0660.75_200409072236.h	nt2 KLX04_660.75-665.75_040907_1_Chir_Q_r.csv	-	2004-09-08	2004-09-08			
2004-09-08	00:22	665.76	670.76	KLX04_0665.76_200409080022.h	nt2 KLX04_665.76-670.76_040908_1_Chir_Q_r.csv	Chir	2004-09-08	2004-09-08			
2004-09-08	10:39	670.76	675.76	KLX04_0670.76_200409081039.h	ht2 KLX04_670.76-675.76_040908_1_Chir_Q_r.csv	Chir	2004-09-08	2004-09-08			
2004-09-08	14:08	675.77	680.77	KLX04_0675.77_200409081408.h	nt2 KLX04_675.77-680.77_040908_1_Pi_Q_r.csv	Pi	2004-09-08	2004-09-08			
2004-09-08	16·18	680 78	685 78	KI X04_0680 78_200409081618 h	ht2 KLX04 680 78-685 78 040908 1 Pi O r csv	Pi	2004-09-08	2004-09-08			

Borehole: KLX04	

APPENDIX 2

Analysis diagrams

APPENDIX 2-1

Test 105.11 – 205.11 m

Analysis diagrams



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

APPENDIX 2-2

Test 205.34 – 305.34 m

Analysis diagrams



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



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


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





CHI phase; log-log match





CHIR phase; log-log match



CHIR phase; HORNER match

Test 305.41 – 405.41 m



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

Test 405.49 – 505.49 m



Pressure and flow rate vs. time; cartesian plot





10 13

tD

10 14

10¹⁵

CHI phase; log-log match

10¹¹

10 12

10

SKB Laxemar / KLX 04 405.49 - 505.49 / Chir

10 4





CHIR phase; log-log match



CHIR phase; HORNER match

Test 505.55 – 605.55 m



Pressure and flow rate vs. time; cartesian plot





CHI phase; log-log match



10

tD/CD

10



10

10



CHIR phase; HORNER match

10 4

Test 605.69 – 705.69 m



Pressure and flow rate vs. time; cartesian plot





CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

Test 705.81 – 805.81 m



Pressure and flow rate vs. time; cartesian plot



Page 2-7/2



CHIR phase analysed as pulse injection; deconvolution match

Test 805.98 – 905.98 m



Pressure and flow rate vs. time; cartesian plot





CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

Test 886.11 – 986.11 m



Pressure and flow rate vs. time; cartesian plot





CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

Test 105.21 – 125.21 m



Pressure and flow rate vs. time; cartesian plot





CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

Test 125.25 – 145.25 m



Pressure and flow rate vs. time; cartesian plot




CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

Test 145.30 – 165.30 m



Pressure and flow rate vs. time; cartesian plot







CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

Test 165.30 – 185.30 m



Pressure and flow rate vs. time; cartesian plot





CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

Test 185.32 – 205.32 m



Pressure and flow rate vs. time; cartesian plot







CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

Test 205.34 – 225.34 m



Pressure and flow rate vs. time; cartesian plot





CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

Test 225.35 – 245.35 m



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



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



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





CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

Test 245.38 – 265.38 m



Pressure and flow rate vs. time; cartesian plot





CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

Test 265.38 – 285.38 m



Pressure and flow rate vs. time; cartesian plot





CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

Test 285.40 – 305.40 m



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



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



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



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



CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match
Test 305.41 – 325.41 m



Pressure and flow rate vs. time; cartesian plot





CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

Test 325.44 – 345.44 m



Pressure and flow rate vs. time; cartesian plot





CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

Test 345.44 – 365.44 m



Pressure and flow rate vs. time; cartesian plot





CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

Test 365.47 – 385.47 m



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot





CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

Test 385.47 – 405.47 m



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match





CHIR phase; log-log match



CHIR phase; HORNER match

Test 405.49 – 425.49 m



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

Test 425.51 – 445.51 m



Pressure and flow rate vs. time; cartesian plot





CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

Test 445.50 – 465.50 m



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



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

Downhole Pressure [kPa]



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



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

0.000



CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

Test 465.52 – 485.52 m



Pressure and flow rate vs. time; cartesian plot



<u>10</u>.⁻³





10

CHI phase; log-log match
10

-3

10





10

CHIR phase; log-log match



CHIR phase; HORNER match

Test 485.52 – 505.52 m



Pressure and flow rate vs. time; cartesian plot





CHIR phase analysed as pulse injection; deconvolution match

Test 505.55 – 525.55 m



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

Test 525.58 – 545.58 m



Pressure and flow rate vs. time; cartesian plot





CHIR phase analysed as pulse injection; deconvolution match

Test 545.62 – 565.62 m



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



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



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



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



CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

Test 565.64 – 585.64 m



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

Test 585.65 – 605.65 m



Pressure and flow rate vs. time; cartesian plot





CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

Test 605.69 – 625.69 m



Pressure and flow rate vs. time; cartesian plot





CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

Test 625.71 – 645.71 m



Pressure and flow rate vs. time; cartesian plot





CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

Test 645.73 – 665.73 m



Pressure and flow rate vs. time; cartesian plot





CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match
Test 665.76 – 685.76 m

6950

6900





Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot



10²

tD

10 ³

CHI phase; log-log match

10 0

10

10 -1

10⁴



CHIR phase; log-log match



CHIR phase; HORNER match

Test 685.79 – 705.79 m



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot



CHIR phase analysed as pulse injection; deconvolution match

Test 805.98 – 825.98 m



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot

CHI phase; log-log match

CHIR phase; log-log match

Not Analysed

CHIR phase; HORNER match

Test 826.02 – 846.02 m



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot

CHI phase; log-log match

CHIR phase; log-log match

Not Analysed

CHIR phase; HORNER match

Test 846.05 – 866.05 m



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot

CHI phase; log-log match

CHIR phase; log-log match

Not Analysed

CHIR phase; HORNER match

Test 866.08 – 886.08 m



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

Test 886.11 – 906.11 m



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



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

9100

9050

9000

8950

8900

8850

8800

8750

8700

8650

8600

0.00

0.20

Downhole Pressure [kPa]



1.60

1.80

2.00

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

0.40

0.60

0.80

1.00

Elapsed Time [h]

1.20

1.40



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

0.01

0.00

2.20



CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

Test 906.16 – 926.16 m



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

Test 926.18 – 946.18 m



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match
Test 943.05 – 963.05 m



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot

10

10

<u>10</u>-3





CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

Test 963.05 – 983.05 m



Pressure and flow rate vs. time; cartesian plot





CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

Test 300.41 – 305.41 m



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

Test 305.41 – 310.41 m



Pressure and flow rate vs. time; cartesian plot



Not Analysed

CHI phase; log-log match

Not Analysed

CHIR phase; log-log match

Not Analysed

CHIR phase; HORNER match

Test 310.42 – 315.42 m



Pressure and flow rate vs. time; cartesian plot





10¹⁰

tD

10 9

10 ¹¹

10¹²

CHI phase; log-log match

10 8



CHIR phase; log-log match



CHIR phase; HORNER match

Test 315.43 – 320.43 m



Pressure and flow rate vs. time; cartesian plot



10

10 -3





CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

Test 320.43 – 325.43 m



Pressure and flow rate vs. time; cartesian plot







CHI phase; log-log match





CHIR phase; log-log match



CHIR phase; HORNER match

Test 325.44 – 330.44 m



Pressure and flow rate vs. time; cartesian plot







CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

Test 330.44 – 335.44 m



Pressure and flow rate vs. time; cartesian plot





10²

tD

10³

10

CHI phase; log-log match

10 0

10



CHIR phase; log-log match



CHIR phase; HORNER match
Test 335.44 – 340.44 m



Pressure and flow rate vs. time; cartesian plot





CHI phase; log-log match

Not Analysed

CHIR phase; log-log match

Not Analysed

CHIR phase; HORNER match

Test 340.44 – 345.44 m



Pressure and flow rate vs. time; cartesian plot





CHI phase; log-log match

-5

10

10





CHIR phase; log-log match



CHIR phase; HORNER match

Test 345.44 – 350.44 m



Pressure and flow rate vs. time; cartesian plot





CHI phase; log-log match

Not Analysed

CHIR phase; log-log match

Not Analysed

CHIR phase; HORNER match

Test 350.45 – 355.45 m



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

Test 355.47 – 360.47 m



Pressure and flow rate vs. time; cartesian plot





CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

Test 360.47 – 365.47 m



Pressure and flow rate vs. time; cartesian plot





CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

Test 365.47 – 370.47 m





Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

Test 370.47 – 375.47 m



Pressure and flow rate vs. time; cartesian plot





CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

Test 375.47 – 380.47 m



Pressure and flow rate vs. time; cartesian plot





CHI phase; log-log match





CHIR phase; log-log match



CHIR phase; HORNER match
Test 380.47 – 385.47 m



Pressure and flow rate vs. time; cartesian plot







CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

Test 385.47 – 390.47 m



Pressure and flow rate vs. time; cartesian plot





CHIR phase analysed as pulse injection; deconvolution match



CHIR phase; alternative log-log match (n=3, spherical flow)

Test 390.48 – 395.48 m



Pressure and flow rate vs. time; cartesian plot





CHIR phase analysed as pulse injection; deconvolution match



CHIR phase; alternative log-log match (n=3, spherical flow)

Test 395.48 – 400.48 m



Pressure and flow rate vs. time; cartesian plot



Not Analysed

CHIR phase analysed as pulse injection; deconvolution match

Test 400.48 – 405.48 m



Pressure and flow rate vs. time; cartesian plot





CHI phase; log-log match





CHIR phase; log-log match



CHIR phase; HORNER match

Test 405.49 – 410.49 m



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match





CHIR phase; log-log match

pD, pD'



CHIR phase; HORNER match

Test 410.50 – 415.50 m



Pressure and flow rate vs. time; cartesian plot





CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

Test 415.51 – 420.51 m



Pressure and flow rate vs. time; cartesian plot





CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

10





CHI phase; alternative log-log match (n=3, spherical flow)

10 -2

Test 420.51 – 425.51 m



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot





CHIR phase analysed as pulse injection; deconvolution match

Test 425.51 – 430.51 m



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot



CHIR phase analysed as pulse injection; deconvolution match



CHIR phase; alternative log-log match (n=3, spherical flow)
Test 430.51 – 435.51 m



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match





CHIR phase; log-log match



CHIR phase; HORNER match

Test 435.50 – 440.50 m



Pressure and flow rate vs. time; cartesian plot



Not Analysed

CHI phase; log-log match

Not Analysed

CHIR phase; log-log match

Not Analysed

CHIR phase; HORNER match

Test 440.50 – 445.50 m



Pressure and flow rate vs. time; cartesian plot







CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

Test 445.50 – 450.50 m

4650

4600





Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot



CHIR phase analysed as pulse injection; deconvolution match

Test 450.50 – 455.50 m



Pressure and flow rate vs. time; cartesian plot







CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

Test 455.50 – 460.50 m



Pressure and flow rate vs. time; cartesian plot





CHIR phase analysed as pulse injection; deconvolution match

Test 460.51 – 465.51 m



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match

10

10

10

10 -

pD, pD'



10²

tD/CD



FLOW MODEL : Homogeneous BOUNDARY CONDITIONS: Constant rate WELL TYPE : Source SUPERPOSITION TYPE : Build-up TC PLOT TYPE : Log-log

10 0

10



CHIR phase; HORNER match

[10 ⁰

m2/s

m3/Pa

10 4

3.09E-09 1.00E-06 1.35E-11 2.00E+00 1.59E+01

T S C n s

10³

Test 465.52 – 470.52 m



Pressure and flow rate vs. time; cartesian plot





CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

Test 470.52 – 475.52 m



Pressure and flow rate vs. time; cartesian plot



Not Analysed

CHI phase; log-log match

Not Analysed

CHIR phase; log-log match

Not Analysed

CHIR phase; HORNER match

Test 475.52 – 480.52 m



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot
CHI phase; log-log match

CHIR phase; log-log match

Not Analysed

CHIR phase; HORNER match

Test 480.52 – 485.52 m



Pressure and flow rate vs. time; cartesian plot





CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

Test 505.55 – 510.55 m



Pressure and flow rate vs. time; cartesian plot



CHI phase; log-log match

CHIR phase; log-log match

Not Analysed

CHIR phase; HORNER match

Test 510.56 – 515.56 m



Pressure and flow rate vs. time; cartesian plot







CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match



CHIR phase; alternative log-log match (n=3, spherical flow)

Test 515.56 – 520.56 m



Pressure and flow rate vs. time; cartesian plot





CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

Test 520.57 – 525.57 m



Pressure and flow rate vs. time; cartesian plot





CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match



CHIR phase; alternative log-log match (n=3, spherical flow)

Test 545.62 – 550.62 m



Pressure and flow rate vs. time; cartesian plot



CHI phase; log-log match

CHIR phase; log-log match

Not Analysed

CHIR phase; HORNER match

Test 550.62 – 555.62 m



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

Test 555.63 – 560.63 m



Pressure and flow rate vs. time; cartesian plot







CHI phase; log-log match









CHIR phase; HORNER match
Test 560.63 – 565.63 m



Pressure and flow rate vs. time; cartesian plot





CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

Test 565.64 – 570.64 m



Pressure and flow rate vs. time; cartesian plot





CHI phase; log-log match

<u>10</u> -3





10

CHIR phase; log-log match



CHIR phase; HORNER match

Test 570.64 – 575.64 m



Pressure and flow rate vs. time; cartesian plot





CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

Test 575.65 – 580.65 m



Pressure and flow rate vs. time; cartesian plot





CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

Test 580.65 – 585.65 m



Pressure and flow rate vs. time; cartesian plot





CHI phase; log-log match





CHIR phase; log-log match



CHIR phase; HORNER match

Test 585.67 – 590.67 m



Pressure and flow rate vs. time; cartesian plot





CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

Test 590.67 – 595.67 m



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

Test 595.69 – 600.69 m



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot

Not Analysed

CHI phase; log-log match

Not Analysed

CHIR phase; log-log match

Not Analysed

CHIR phase; HORNER match

Test 600.69 – 605.69 m





Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match
Test 605.69 – 610.69 m



Pressure and flow rate vs. time; cartesian plot





CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

Test 610.70 – 615.70 m



Pressure and flow rate vs. time; cartesian plot





1

tD

10 ¹³

10¹²

<u>.</u> 1

CHI phase; log-log match

FLOW MODEL : Homogeneous BOUNDARY CONDITIONS: Constant pressure WELL TYPE : Source SUPERPOSITION TYPE : No superposition PLOT TYPE : Log-log

10 ¹¹

1/qD, (1/qD)'

0.3

10 -1

m2/s ---

10 ¹⁵

T= 2.58E-07 S= 1.00E-06 n= 2.00E+00 s= 9.51E+00

10 ¹⁴



CHIR phase; log-log match



CHIR phase; HORNER match

Test 615.70 – 620.70 m



Pressure and flow rate vs. time; cartesian plot







CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

Test 620.71 – 625.71 m



Pressure and flow rate vs. time; cartesian plot





CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

Test 625.71 – 630.71 m



Pressure and flow rate vs. time; cartesian plot





CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

Test 630.72 – 635.72 m



Pressure and flow rate vs. time; cartesian plot



CHI phase; log-log match

CHIR phase; log-log match

Not Analysed

CHIR phase; HORNER match

Test 635.72 – 640.72 m



Pressure and flow rate vs. time; cartesian plot



CHI phase; log-log match

CHIR phase; log-log match

Not Analysed

CHIR phase; HORNER match

Test 640.73 – 645.73 m



Pressure and flow rate vs. time; cartesian plot



CHI phase; log-log match

CHIR phase; log-log match

Not Analysed

CHIR phase; HORNER match

Test 645.73 – 650.73 m



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match
Test 650.74 – 655.74 m



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

Test 655.75 – 660.75 m



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

Test 660.75 – 665.75 m



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot

Not Analysed

CHI phase; log-log match

Not Analysed

CHIR phase; log-log match

Not Analysed

CHIR phase; HORNER match

Test 665.76 – 670.76 m

6800

6750





Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot



tD

CHI phase; log-log match





CHIR phase; log-log match



CHIR phase; HORNER match

Test 670.76-675.76 m



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot



CHI phase; log-log match



CHIR phase; log-log match



CHIR phase; HORNER match

Test 675.77 – 680.77 m



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot



CHIR phase analysed as pulse injection; deconvolution match

Test 680.78 – 685.78 m



Pressure and flow rate vs. time; cartesian plot



Interval pressure and temperature vs. time; cartesian plot



CHIR phase analysed as pulse injection; deconvolution match

Borehole: KLX04

APPENDIX 3

Test Summary Sheets

	Test Si	umr	nary Sheet			
Project:	Oskarshamn site investig	ation	Test type:[1]	Chir		
Area:	Lax	emar	Test no:			1
Borehole ID:	KI	LX04	Test start:			040820 10:27
Test section from - to (m):	105.11-205.	11 m	Responsible for test execution:			Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	C	0.076	Responsible for		Cristi	an Enachescu
Linear plot Q and p			Flow period		Recovery period	
			Indata		Indata	
2300 KLX04_105.11-205.11_040820_1_CHir_Q_r	-	20	n _e (kPa) =	1986	indutu	
3100		- 18	p ₀ (kPa) =	1986		┫────┤
2100			$p_i(kPa) =$	2191	n (kDa) -	1097
1900 -		16	$p_p(\mathbf{KPa}) =$	2181	р _Е (кра) –	1980
-		- 14	Q _p (m [°] /s)=	1.68E-04		1000
오 1700 ·		o []/min]	tp (s) =	1800	t _F (S) =	1800
tole Pres	P section ▲ P above P holosy	12 la logi	S el S (-)=	1.00E-04	S el S (-)=	1.00E-04
1500 ·		<u>वैंद</u> 10	EC _w (mS/m)=			
1300 -			Temp _w (gr C)=	9.7		
		8	Derivative fact.=	0.02	Derivative fact.=	0.03
1100 -		6				
900 0.50 100	150 200	4	Results		Results	
Elap	sed Time [h]		$O(z_1/z_2^2/z_2)$	8 5E-06	Results	
Log Log plot incl. dorivatoo f	low poriod		Q/s (ff /s) =	0.3E-00		
Log-Log plot lifel. derivates- li	low period		I _M (m ⁻ /s)=	1.1E-00		transiant
			Flow regime:		Flow regime:	transient
Elapsed time [h]			$dt_1(min) =$	0.71	$dt_1 (min) =$	0.68
SKB Laxemar / KLX 04 105.11 - 205.11 / Chir	FlowDim Version 2.14b (c) Golder Associates	na	$dt_2(min) =$	16.93	$dt_2 (min) =$	10.69
			$T(m^{2}/s) =$	2.2E-05	T (m²/s) =	3.8E-03
	1	10 -1	S (-) =	1.0E-04	S (-) =	1.0E-04
10			$K_s (m/s) =$	2.2E-07	$K_s (m/s) =$	3.8E-05
	α -	0.03	$S_{s}(1/m) =$	1.0E-06	S _s (1/m) =	1.0E-06
100 CBN	•	10 "	C (m³/Pa) =	NA	C (m³/Pa) =	3.0E-09
10 0		14	C _D (-) =	NA	C _D (-) =	3.3E-03
		0.003	ξ(-) =	9.4	ξ(-) =	21.3
		10 -3	$T_{GPE}(m^2/s) =$		$T_{GRF}(m^2/s) =$	
10 ⁻¹¹ 10 ⁻¹² 10 ⁻¹² 10 ⁻¹²	10 ** 10 ** 10 **		$S_{GRF}(-) =$		$S_{GRF}(-) =$	
			$D_{GRF}(-) =$		$D_{GRF}(-) =$	
Log-Log plot incl. derivatives-	recovery period		Selected represe	ntative param	neters.	
			dt₁ (min) =	0.71	C (m ³ /Pa) =	3.0E-09
Elapsed time [h]			dt_2 (min) =	16.93	$C_{\rm D}(-) =$	3.3F-03
10 ² 5KB Laxemar / KL X 04			$T_{1}(m^{2}(a)) =$	2 2E-05	ε ₍₋) =	9.4
105.11 - 205.11 / CHI	(c) Golder Associates	00	S(-) =	1.0E-04	ς (⁻) −	0.1
····			K (m/s) =	2.25.07		┫────┤
	10	D ²	$R_{s}(11/5) =$	2.2E-07		
			$S_{s}(1/11) =$	1.0E-00		
	30	n (KPa)	Comments:			. 10 1
	10	- 9d	The recommended to analysis of the CHi	ransmissivity of	2.2E-5 m2/s was de	d derivative
10 °	analysis of the CHI phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is					
· · · · · · · · · · · · · · · · · · ·	estimated to be 8.0E-6 to 4.0E-5 m2/s. The flow dimension displa					sion displayed
			during the test is 2.	The static press	ure measured at tran	sducer depth,
10 ¹ 10 ²	10 ⁻³ 10 ⁻⁴ 10 ⁻⁵	D	was derived from th	e CHir phase us	ing straight line extr	apolation in the
(D)CD			Horner plot to a val	ue of 1986.4 kP	a.	







	Test Sum	mary Sheet				
Project:	Oskarshamn site investigation	n <u>Test type:[1]</u>	Chir			
Area:	Laxema	r Test no:	1			
Borehole ID:	KLX04	4 Test start:	040821 14:57			
Test section from - to (m):	505.55-605.55 n	Responsible for test execution:	Jörg Böhne			
Section diameter, $2 \cdot r_w$ (m):	0.070	6 Responsible for	Cristian Enaches			
Linear plot Q and p		Flow period		Recovery period		
		Indata		Indata		
6200 KLX04_505.55-605.55_040821_1_CHir_Q_r	8	n_{o} (kPa) =	5909	indutu		
8000	7	p ₀ (kPa) =	5905			
		$p_1(kPa) =$	6106	n_ (kPa) =	5007	
5800 -	- 6		5 78E 05	р _F (кга) -	3907	
-	- 5	$Q_p (m^{\circ}/s) =$	5.78E-05	4 (-)	1200	
<u>4</u> 2 5600 - ∎	te [[mira]	tp (s) =	1800	t _F (S) =	1200	
82 4 49 6 5400 -	P section _ 4 A P above 5 5 5 5 5 5 5 5 5 5 5 5 5 5	S el S (-)=	1.00E-06	S el S (-)=	1.00E-06	
l l	·	EC _w (IIIS/III)=	16.2			
5200 -		Temp _w (gr C)=	16.3			
	•	Derivative fact.=	0.07	Derivative fact.=	0.08	
5000	- 1					
4800		Deculto		Deculto		
0.00 0.20 0.40 0.80 0.80 Elaps	1.00 1.20 1.40 1.80 1.80 sed Time [h]		2 95 06	Results		
Log Log plot incl. dorivatoo fi	aw pariod	Q/s (m⁻/s)=	2.82-00			
Log-Log plot incl. derivates- fi	ow period	I _M (m²/s)=	3.7E-06	-		
		Flow regime:	transient	Flow regime:	transient	
Elapsed time [h]	l	$dt_1 (min) =$	3.37	$dt_1 (min) =$	0.56	
10 SKB Laxemar / KLX 04 505.55 - 605.55 / Chi	FlowDim Version 2.14b (c) Golder Associates	$dt_2 (min) =$	8.18	$dt_2 (min) =$	1.12	
•••	10 ⁰	T (m²/s) =	4.1E-06	T (m²/s) =	3.3E-06	
10 ¹		S (-) =	1.0E-06	S (-) =	1.0E-06	
	10 -1	K_{s} (m/s) =	4.1E-08	$K_s (m/s) =$	3.3E-08	
		$S_{s}(1/m) =$	1.0E-08	$S_s(1/m) =$	1.0E-08	
1, 040, 1		C (m³/Pa) =	NA	C (m³/Pa) =	1.3E-09	
	10 [*] ^g	$C_D(-) =$	NA	$C_D(-) =$	1.4E-01	
10 -1		ξ(-) =	0.9	ξ(-) =	-0.2	
	10 3	- , 2, ,		- <u> </u>		
10 ⁵ 10 ⁶	10 ⁷ 10 ⁸ 10 ⁹	$I_{GRF}(m^{-}/s) =$		l _{GRF} (m ⁻ /s) =		
		$S_{GRF}(-) =$		$S_{GRF}(-) =$		
Log Log plot incl. derivatives	recovery period	D _{GRF} (-) -	ntotivo novon			
Log-Log plot men derivatives-	recovery period	dt (min) =	ntative param		1 25 00	
E)d Mar. 1	INI	$dt_1(min) =$	3.37	C (m)Pa) =	1.3E-09	
10 ⁻² SKR Lavemar / KI X 04	10, 210, 10, 10, 10, 10, 10, 10, 10, 10, 10,	$dl_2(min) =$	8.18	$C_D(-) =$	1.4E-01	
505.55 - 605.55 / Chir	(c) Golder Associates	$T_T (m^2/s) =$	4.1E-06	ξ(-) =	0.9	
		S (-) =	1.0E-06			
10		$K_s (m/s) =$	4.1E-08			
· · · · ·	10 2	$S_{s}(1/m) =$	1.0E-08			
	An and a second se	Comments:				
	* ************************************	The recommended	ransmissivity of	4.1E-6 m2/s was de	erived from the	
	the second second second second second second second second second second second second second second second se	quality The confide	pnase, which sh	ows the best data an	u derivative	
10	and and	estimated to be 1.01	E-6 to $5.0E-6$ m ²	2/s. The flow dimens	sion displayed	
	10 °	during the test is 2.	The static press	ure measured at tran	sducer depth,	
10 ⁰ 10 ¹	10 ² 10 ³ 10 ⁴	was derived from th	e CHir phase us	ing straight line extr	rapolation in the	
tDic		Horner plot to a val	ue of 5905.1 kP	a.		

	Test Sum	mary Sheet			
Project:	Oskarshamn site investigatio	n <u>Test type:[1]</u>			Chir
Area:	Laxema	ir Test no:			7
Borehole ID:	KLX0	4 Test start:	040822 08:12		
Test section from - to (m):	605.69-705.69 r	n Responsible for test execution:	Jörg Böhner		
Section diameter, $2 \cdot r_w$ (m):	0.07	6 Responsible for	Cristian Enachese		
Linear plot Q and p		Flow period		Recovery period	
7000	-	Indata		Indata	
KLX04_605.69-705.69_040822_1_CHir_Q	_r	p ₀ (kPa) =	6884		
7000 -	4.5	p _i (kPa) =	6881		
	4.0	p _p (kPa) =	7082	p _F (kPa) =	6884
6800 -	- 3.5	$Q_{p} (m^{3}/s) =$	4.60E-05		
e 6600	^{3.0} ਵ	tp(s) =	1800	t _F (s) =	1500
	P section P above 2.5 g	S el S [*] (-)=	1.00E-06	S el S [*] (-)=	1.00E-06
8 4 6400 -		$EC_w (mS/m) =$			
		Temp _w (gr C)=	18.1		
6200		Derivative fact.=	0.05	Derivative fact.=	0.05
6000 -	- 1.0				
	- 0.5				
5800 0.20 0.40 0.60 0.80	1.00 1.20 1.40 1.60 1.80	Results		Results	·
Elaç	used Time [h]	Q/s $(m^{2}/s)=$	2.2E-06		
Log-Log plot incl. derivates- f	flow period	$T_{\rm M} (m^2/s) =$	2.9E-06		
		Flow regime:	transient	Flow regime:	transient
Elapsed time	≈ (ħ)	dt ₁ (min) =	2.17	dt₁ (min) =	0.37
10 ² SKB Laxemar / KLX 04	1ρFlowDim Version 2.14b	dt_2 (min) =	23.29	dt ₂ (min) =	2.28
603.69 - 703.69 / Cill	(c) Golder Associates	$T(m^{2}/s) =$	3.9E-06	T (m ² /s) =	3.3E-06
10 1		S (-) =	1.0E-06	S (-) =	1.0E-06
	- 	$K_s (m/s) =$	3.9E-08	$K_s (m/s) =$	3.3E-08
	10	S _s (1/m) =	1.0E-08	S _s (1/m) =	1.0E-08
10 °		C (m ³ /Pa) =	NA	C (m ³ /Pa) =	2.9E-10
	10 2 3	C _D (-) =	NA	C _D (-) =	3.2E-02
10 -1	•	ξ(-) =	2.6	ξ(-) =	1.7
	• • •				
	a	$T_{GRF}(m^2/s) =$		T _{GRF} (m ² /s) =	
טר טר ז	10 10 ID	S _{GRF} (-) =		S _{GRF} (-) =	
		D _{GRF} (-) =		D _{GRF} (-) =	
Log-Log plot incl. derivatives	 recovery period 	Selected represe	entative paran	neters.	
		dt ₁ (min) =	2.17	C (m³/Pa) =	2.9E-10
Elapsed time	e [h]	dt_2 (min) =	23.29	C _D (-) =	3.2E-02
10 SKB Laxemar / KLX 04 605.69 - 705.69 / Chir	FlowDim Version 2.14b (c) Golder Associates	$T_T (m^2/s) =$	3.9E-06	ξ(-) =	2.6
		S (-) =	1.0E-06		
10 1		K_{s} (m/s) =	3.9E-08		
	10 ²	$S_{s}(1/m) =$	1.0E-08		
· · · · · · · · · · · · · · · · · · ·		Comments:			
	10 ¹	The recommended	transmissivity of	f 3.9E-6 m2/s was de	erived from the
•	· · · · · · · · · · · · · · · · · · ·	analysis of the CHi	phase, which sh	ows the best data an	d derivative
¹⁰ quality. The confidence range for the interval transmissivity is estimated to be 2 0F-6 to 5 0F-6 m ² /s. The flow dimension displ				sion displayed	
	10 [°]	during the test is 2.	The static press	ure measured at tran	sducer depth,
10 ¹ 10 ²	10 ⁻³ 10 ⁻⁴ 10 ⁻⁵	was derived from th	ne CHir phase us	sing straight line ext	rapolation in the
tD.	100	Horner plot to a val	lue of 6882.9 kP	a.	

	Test	t Sumn	nary Sheet					
roject:	Oskarshamn site inve	estigation	Test type:[1]			F		
Area: Laxemar		Test no:						
Borehole ID: KLX04		KLX04	Test start:		040822 11:37			
est section from - to (m):	705.81-8	305.81 m	Responsible for	Jörg Böhne				
Section diameter, $2 \cdot r_w$ (m):		0.076	Responsible for	Cristian Enachesco				
inear plot Q and p			Flow period		Recovery period			
			Indata		Indata			
8200	KLX04_705.81-805.81_040822_1_Pi_Q_r	0.30	p ₀ (kPa) =	7866				
8000 -		0.25	p _i (kPa) =	7876				
		.	p _p (kPa) =	8104	p _F (kPa) =	798		
7800 •		- 0.20	$Q_{p} (m^{3}/s) =$	-				
2 7600 ·		(mim)	tp (s) =	-	t _F (s) =	540		
Pross u	P section P above	- 0.15 B	S el S [*] (-)=	1.00E-06	S el S [*] (-)=	1.00E-0		
9 7400 -	P below Q	Injecti	EC _w (mS/m)=					
7200 •		- 0.10	Temp _w (gr C)=	19.7				
			Derivative fact.=	-	Derivative fact.=	0.1		
7000 -		- 0.05						
6800								
0.00 0.40 0.80	1.20 1.60 2.00 Elapsed Time [h]	2.40	Results		Results			
			Q/s (m^{2}/s)=	NA				
	<i>c</i> i <u>·</u> · ·		$T (m^2/c) =$	NA				
.og-Log plot incl. derivate	s- flow period		T _M (III /S)-		Flow regime:	transient		
.og-Log plot incl. derivate	s- flow period		Flow regime:	transient				
.og-Log plot incl. derivate	s- flow period		Flow regime: dt_1 (min) =	transient -	dt_1 (min) =	0.2		
.og-Log plot incl. derivate	s- flow period		Flow regime: $dt_1 (min) =$ $dt_2 (min) =$	transient - -	$dt_1 (min) = dt_2 (min) = dt_$	0.2		
.og-Log plot incl. derivate	s- flow period		Flow regime: $dt_1 (min) =$ $dt_2 (min) =$ $T (m^2/s) =$	transient - - NA	$dt_1 (min) =$ $dt_2 (min) =$ $T (m^2/s) =$ S (x) =	0.2 2.5 3.5E-1		
.og-Log plot incl. derivate	s- flow period		Flow regime: $dt_1 (min) =$ $dt_2 (min) =$ $T (m^2/s) =$ S (-) = K (m/s) =	transient - NA NA	$\begin{array}{l} \text{dt}_{1} (\text{min}) &= \\ \text{dt}_{2} (\text{min}) &= \\ \text{T} (\text{m}^{2}/\text{s}) &= \\ \text{S} (-) &= \\ \text{K} (\text{m/a}) &= \\ \end{array}$	0.2 2.5 3.5E-1 1.0E-0		
og-Log plot incl. derivate	S- TIOW period		Flow regime: $dt_1 (min) =$ $dt_2 (min) =$ $T (m^2/s) =$ S (-) = $K_s (m/s) =$ S (1/m) =	transient - NA NA NA	$\begin{array}{llllllllllllllllllllllllllllllllllll$	0.2 2.5 3.5E-1 1.0E-0 3.5E-1		
og-Log plot incl. derivate	s- now period		Flow regime: Flow regime: $dt_1 (min) =$ $dt_2 (min) =$ $T (m^2/s) =$ S (-) = $K_s (m/s) =$ $S_s (1/m) =$ $C (m^3/D_s)$	transient - NA NA NA NA NA	$dt_{1} (min) = dt_{2} (min) = dt_{2} (min) = dt_{2} (min) = K_{s} (n/s) = K_{s} (m/s) = S_{s} (1/m) = C_{s} (m^{3}/D_{s})$	0.2 2.5 3.5E-1 1.0E-0 3.5E-1 1.0E-0		
<u>-og-Log plot incl. derivate</u> Not	s- now period		Flow regime: $dt_1 (min) =$ $dt_2 (min) =$ $T (m^2/s) =$ S (-) = $K_s (m/s) =$ $S_s (1/m) =$ $C (m^3/Pa) =$ $C_2 (c) =$	transient - NA NA NA NA NA NA	$dt_{1} (min) = dt_{2} (min) = dt_{2} (min) = dt_{2} (min) = dt_{3} (min) = dt_{$	0.2 2.5 3.5E-1 1.0E-0 3.5E-1 1.0E-0 1.4E-1 1.5E-0		
.og-Log plot incl. derivate	s- flow period		Flow regime: $dt_1 (min) =$ $dt_2 (min) =$ $T (m^2/s) =$ S (-) = $K_s (m/s) =$ $S_s (1/m) =$ $C (m^3/Pa) =$ $C_D (-) =$ $\xi (-) =$	transient - NA NA NA NA NA NA NA	$dt_{1} (min) = dt_{2} (min) = dt_{2} (min) = dt_{2} (min) = dt_{2} (min) = dt_{2} (min) = dt_{2} (min) = dt_{2} (min) = dt_{3} (min) = dt_{$	0.2 2.5 3.5E-1 1.0E-0 3.5E-1 1.0E-0 1.4E-1 1.5E-0		
.og-Log plot incl. derivate	s- now period		$\begin{array}{rcl} Flow \ regime: \\ Flow \ regime: \\ \hline flow \$	transient - NA NA NA NA NA NA NA NA	$\begin{array}{rcl} dt_1 (min) & = \\ dt_2 (min) & = \\ T (m^2/s) & = \\ S (-) & = \\ S (-) & = \\ K_s (m/s) & = \\ S_s (1/m) & = \\ C_s (1/m) & = \\ C_D (-) & = \\ \xi (-) & = \\ \end{array}$	0.2 2.5 3.5E-1 1.0E-0 3.5E-1 1.0E-0 1.4E-1 1.5E-0 2.		
<u>-og-Log plot incl. derivate</u> Not	s- now period		Flow regime: $dt_1 (min) =$ $dt_2 (min) =$ $T (m^2/s) =$ S (-) = $K_s (m/s) =$ $S_s (1/m) =$ $C (m^3/Pa) =$ $C_D (-) =$ $\xi (-) =$ $T (m^2/s) =$	transient - NA NA NA NA NA NA NA	$dt_{1} (min) = dt_{2} (min) = dt_{2} (min) = dt_{2} (min) = dt_{2} (min) = dt_{3} (min) = dt_{$	0.2 2.5 3.5E-1 1.0E-0 3.5E-1 1.0E-0 1.4E-1 1.5E-0 2.		

D_{GRF} (-)

dt₁ (min)

dt₂ (min)

S_s (1/m)

Comments:

S (-) K_s (m/s)

 $T_{T} (m^{2}/s) =$

=

=

=

=

=

=

Selected representative parameters.



The recommended transmissivity of 3.5E-10 m2/s was derived from the
analysis of the Pi phase. It should be noted that due to the very low
interval transmissivity the results are very uncertain. The confidence
range for the interval transmissivity is estimated to be 8.0E-11 to 7.0E-
10 m2/s. The flow dimension displayed during the test is 2. No static
pressure could be derived.

D_{GRF} (-)

 $0.27 C (m^3/Pa) =$

2.52 C_D (-)

3.5E-10ξ(-)

1.0E-06

3.5E-12

1.0E-08

=

=

=

1.4E-10

1.5E-02

2.7



	Test Sum	marv Sheet				
Project:	Oskarshamn site investigation	Test type:[1]			Chir	
Area:	Laxema	r Test no:			1	
Borehole ID:	KLX04	4 Test start:			040823 08:00	
Test section from - to (m): 886.11-986.11 m		n Responsible for test execution:	Jörg Böhner			
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:	Cristian Enachesc			
Linear plot Q and p	-	Flow period		Recovery period		
10/00		Indata		Indata		
10400	KLX04_886.11-986.11_040823_1_CHir_Q_r	p ₀ (kPa) =	9627			
10200 -	- 3.5	p _i (kPa) =	9620			
10000 -		$p_{p}(kPa) =$	9819	p₌ (kPa.) =	9637	
		$\rho_{p(11)}(m^{3}/c) =$	1 49F-05		,037	
9800	25	$Q_p (m/s) =$	1800	t- (s) =	1800	
€ 9600 8	and a second second second second second second second second second second second second second second second	(p(3)) =	1.00E.06	ι _F (3) –	1.00E.06	
26 8 9400	P section 5	S el S (-)=	1.00E-06	S el S (-)=	1.00E-06	
Down	Polove *	EC _w (mS/m)=	22.6			
		Temp _w (gr C)=	22.6			
9000 -	1.0	Derivative fact.=	0.21	Derivative fact.=	0.18	
8800 -	• 0.5					
8600 0.20 0.40 0.60 0.80	1.00 1.20 1.40 1.60 1.80 2.00	Results		Results		
Eis	psed Time [h]	Q/s $(m^{2}/s)=$	7.4E-07			
Log-Log plot incl. derivates-	flow period	T_{M} (m ² /s)=	9.6E-07			
	· · ·	Flow regime:	transient	Flow regime:	transient	
Elarget line	5.05	dt_1 (min) =	1.22	dt₁ (min) =	4.02	
10 ²	⁽²⁾ , 10, ⁻¹ , 10, ⁰	dt_2 (min) =	13.18	dt_2 (min) =	24.94	
SKB Laxemar / KLX 04 886.11 - 986.11 / Chi	FlowDim Version 2.14b (c) Golder Associates 10 1	$T_{m}^{2}(n) =$	6 1F-07	$T_{m}(m^{2}(c)) =$	8 2F-07	
		S(-) =	1.0E-06	S(-) =	1.0E-06	
10		$K_{(m/s)} =$	6.1E-00	K (m/s) =	8.2E-00	
• • • • • • • • • • • • • • • • • • •		$R_{s}(11/3) =$	1.0E.08	$R_{s}(11/3) =$		
JGP: 10 °		$S_{s}(1/11) =$		$O_{s}(1/11) =$	2 1E 00	
	10 ⁻¹ II II II II II II II II II II II II II	$C(m^{2}/Pa) =$		C (m ⁷ /Pa) =	2.12-09	
		$C_D(-) =$		$C_D(-) =$	2.3E-01	
10	10 -2	ζ(-) =	-2.2	ξ(-) =	-1.4	
		$T_{CDF}(m^2/s) =$		$T_{CDF}(m^2/s) =$		
10 ⁻² 10	3 10 ⁴ 10 ⁵ 20	$S_{GRF}(-) =$		$S_{GRF}(-) =$		
		$D_{GRF}(-) =$		$D_{GRE}(-) =$		
Log-Log plot incl. derivatives	- recovery period	Selected represe	entative paran	neters.		
		dt₁(min) =	4.02	$C (m^3/Pa) =$	2.1E-09	
-) Elapsed ime_[h]	I	dt_2 (min) =	24.94	$C_{n}(-) =$	2.3E-01	
10 ²	FlowDim Version 2.14b	$T_{1}(m^{2}/c) =$	8 2F-07	ξ ₍₋) =	-1 4	
886.11 - 896.11 / Chir	(c) Golder Associates	$S_{(-)} =$	1.0E-06	ς (-)	11	
	10 -	$K_{(m/s)} =$	8.2E.00			
10 1	300	$R_{s}(11/s) =$	0.2L-09			
		$S_s(1/11) =$	1.0E-00			
	10 ² & a		, , .		. 10 4	
	30 70 4	The recommended	transmissivity of	t 8.2E-/ m2/s was de hows the best data a	erived from the	
¹⁰ .	30	quality. The confide	ence range for th	ne interval transmiss	ivity is	
	• 10 ¹	estimated to be 6.01	E-7 to 1.0E-6 m	2/s. The flow dimens	sion displayed	
		during the test is 2.	The static press	ure measured at tran	sducer depth,	
10 [°] 10 ¹ tpicb	10 ⁻² 10 ⁻³	was derived from the	ne CHir phase us	sing straight line extra	rapolation in the	
		Horner plot to a val	lue of 9623.8 kP	a.		
	Test Sumr	nary Sheet				
--	--	--	--	--	-------------------	--
Project:	Oskarshamn site investigation	Test type:[1]			Chir	
Area:	Laxemar	Test no:			1	
Borehole ID:	KLX04	Test start:			040824 07:29	
Test section from - to (m):	105.21-125.21 m	Responsible for		Jörg Böhne		
Section diameter, 2·r _w (m):	0.076	Responsible for		Crist	ian Enachescu	
Linear plat O and p		test evaluation:		Becovery period		
Linear plot Q and p		Flow period		Recovery period	f	
1600 KLX04 105.21-125.21 040824 1 CHir Q r	10	indata	1205	Indata	T	
•	P section P above 9	$p_0 (kPa) =$	1203			
1500	P below Q + 8	р _і (кРа) =	1209		1200	
1400 -	-7	р _р (кРа) =	1410	р _F (кРа) =	1209	
- I	•	$Q_p (m^3/s) =$	5.00E-05		1200	
호 1300 ·		tp (s) =	1200	t _F (s) =	1200	
e de 1200	- 5 82	S el S (-)=	1.00E-06	S el S (-)=	1.00E-06	
	- 4 ^{- 4}	EC _w (mS/m)=				
1100 -	- 3	Temp _w (gr C)=	8.6			
	-2	Derivative fact.=	0.30	Derivative fact.=	0.05	
	- 1					
	0 1.80 1.00 1.20 1.40 1.60	Results		Results		
Lapor	2 mm [n]	Q/s (m ² /s)=	2.4E-06			
Log-Log plot incl. derivates- flo	ow period	Τ _M (m²/s)=	2.6E-06			
		Flow regime:	transient	Flow regime:	transient	
Elapsed time [h]		dt ₁ (min) =	1.85	dt ₁ (min) =	2.00	
10 SKB Laxemar / KLX 04 105.21 - 125.21 / Chi	FowDin Version 2.146	dt_2 (min) =	3.52	dt ₂ (min) =	5.10	
		T (m ² /s) =	2.6E-06	T (m ² /s) =	2.5E-06	
10 1	10	S (-) =	1.0E-04	S (-) =	1.0E-04	
• • • • • • • • • • • • • • • • • • •		$K_s (m/s) =$	1.3E-07	$K_s (m/s) =$	1.2E-07	
· · · ·	to ⁻¹	S _s (1/m) =	5.0E-06	S _s (1/m) =	5.0E-06	
10 ° 10 ° 10 ° 10 ° 10 ° 10 ° 10 ° 10 °	(build) (tr	C (m ³ /Pa) =	NA	C (m ³ /Pa) =	1.8E-09	
i i i i i i i i i i i i i i i i i i i	We and the state of the state o	C _D (-) =	NA	C _D (-) =	2.0E-03	
10 -1		ξ(-) =	2.3	ξ(-) =	2.3	
10 ⁴ 10 ²	10 ⁻⁰	T _{GRF} (m ² /s) =		T _{GRF} (m ² /s) =		
2		S _{GRF} (-) =		S _{GRF} (-) =		
		D _{GRF} (-) =		D _{GRF} (-) =		
Log-Log plot incl. derivatives-	recovery period	Selected represe	entative paran	neters.		
		dt ₁ (min) =	1.85	C (m³/Pa) =	1.8E-09	
Elapsed time [h]	10, ¹ 10, ¹ 10, ⁰ 1	dt_2 (min) =	3.52	C _D (-) =	2.0E-03	
10 SKB Laxemar / KLX 04 105.21 - 125.21 / Chir	FlowDim Version 2.14b (c) Golder Associates	$T_{T} (m^{2}/s) =$	2.6E-06	ξ(-) =	2.3	
	10 5	S (-) =	1.0E-04			
10 1		K _s (m/s) =	1.3E-07			
	10 ²	S _s (1/m) =	5.0E-06			
		Comments:				
۹	• 1054 T	The recommended	transmissivity of	f 2.6E-6 m2/s was de	erived from the	
	Va	analysis of the CHi	phase, which sh	ows the best data an	d derivative	
10 -1	· · · · · · · · · · · · · · · · · · ·	quality. The confide	ence range for the form $5.0E_{10}$ for the form	ie interval transmiss	ivity is	
•	10 °	during the test is ?	The static press	ure measured at tran	sducer denth	
10 0 10 1	10 ² 10 ³ 10 ⁴	was derived from th	e CHir phase us	sing straight line ext	rapolation in the	
Long the second se	·- ···	Horner plot to a val	ue of 1209.2 kP	a.		





	Test S	umr	nary Sheet			
Project:	Oskarshamn site investig	gation	Test type:[1]			Chir
Area:	Lax	emar	Test no:			1
Borehole ID:	к	LX04	Test start:	040824 23:44		
Test section from - to (m):	165.30-185.30 m		Responsible for test execution:		Jörg Böhr	
Section diameter, 2·r _w (m):	0.076 R		Responsible for		Cristian Enachescu	
Linear plot Q and p			Flow period		Recovery period	
			Indata		Indata	
2100	KLX04_0165.30-185.30_040824_1_CHir_Q_r	1.0	p ₀ (kPa) =	1793		
2000			p _i (kPa) =	1793		
2000 -	P section	- 0.8	$p_{p}(kPa) =$	1993	p _F (kPa) =	1793
1900 -	P above P below		Ω_{r} (m ³ /s)=	8.97E-06	, ,	
(ed x)		0.6 g	$\frac{dp}{dp}$ (m / b) =	1200	t _F (s) =	1200
1800		Rate []/rr	S el S [*] (-)=	1.00E-04	Sel S [*] (-)=	1.00E-04
with to le		P lujection	EC _w (mS/m)=		0 0 0 (-)-	
ă 1700 -			Temp _w (ar C)=	9.5		
			Derivative fact =	0.07	Derivative fact =	0.02
1600		- 0.2		0.07		0.02
1500	0.80 1.00 1.20 1.40 1.	0.0	Results		Results	<u> </u>
Elaps	ed Time [h]		$\Omega/s (m^2/s) =$	4.4E-07		I
Log-Log plot incl. derivates- fl	ow period		$T_{\rm ex} (m^2/s) =$	4.6F-07		
			Flow regime:	transient	Flow regime:	transient
			dt₄ (min) =	0.78	dt₄ (min) =	0.67
10 ² SKR Lavenar / KLX 04	ال ال ال ال ال ال ال ال ال ال ال ال ال ا	}	dt_2 (min) =	14 23	dt_2 (min) =	7.92
165.30 - 185.30 / Chi	(c) Golder Associates	10 1	$T(m^2/c) =$	5 4F-07	$T_{m}^{2}(n) =$	1 7E-06
· .		-	S(-) =	1.0E-04	S(-) =	1.0E-04
10 • • • • • • • • • • • • • • • • • • •			K (m/s) =	2.7E-08	K (m/s) =	8.3E-08
			$R_{s}(11/3) =$	5.0E-06	$S_{s}(1/m) =$	5.0E-06
		(mint)	$O_{\rm s}$ (m ³ /D ₂) =	0.0E-00	$O_{s}(m^{3}/D_{c}) =$	1.3E-10
2		10 - 10 -	C(m/Pa) =		$C_{(m)}(Pa) =$	1.3E-10
10 -1			$\mathcal{C}_{D}(-) =$	26	CD(-) -	1.42-04
		10 -2	ς(-) -	2.0	ς(-) -	17.1
		ļ	$T_{GRF}(m^2/s) =$		$T_{GRF}(m^2/s) =$	
a, ci	10 10		$S_{GRF}(-) =$		$S_{GRF}(-) =$	
			D _{GRF} (-) =		D _{GRF} (-) =	
Log-Log plot incl. derivatives-	recovery period		Selected represe	ntative param	neters.	
			dt ₁ (min) =	0.78	C (m ³ /Pa) =	1.3E-10
Elapsed time [[h] 2		dt_2 (min) =	14.23	C _D (-) =	1.4E-04
10 SKB Laxemar / KLX 04 165.30 - 185.30 / Chir	FlowDim Version 2.14b (c) Golder Associates		T_{T} (m ² /s) =	5.4E-07	ξ(-) =	2.6
* ••••••••••		-	S (-) =	1.0E-04	• • • •	
10 1		10 2	$K_s (m/s) =$	2.7E-08		
		ł	$S_{s}(1/m) =$	5.0E-06		
8 10 0		10 1 2	Comments:			<u> </u>
10 ⁻¹		1004-8-1064	The recommended t analysis of the Chi p quality. The confide estimated to be 3.0F during the test is 2. was derived from th	transmissivity of phase, which sho ence range for th E-7 to 7.0E-7 m ² The static press and CHir phase us and chir phase us	f 5.4E-7 m2/s was de bows the best data and e interval transmissi 2/s. The flow dimensure measured at transing straight line extra c	rived from the l derivative vity is sion displayed sducer depth, rapolation in the
			Horner plot to a val	ue of 1792.2 kP	a.	



	Test Sum	mary Sheet			
Project:	Oskarshamn site investigation	Test type:[1]			Chir
Area:	Laxemar	Test no:			1
Borehole ID:	KLX04	Test start:			040825 08:49
Test section from - to (m):	205.34-225.34 m	Responsible for test execution:		Jörg Böhne	
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:		Crist	ian Enachescu
Linear plot Q and p		Flow period		Recovery period	
i		Indata		Indata	
2350 KLX04_205.34-225.34_040825_1_CHir_Q_r	P section	p₀ (kPa) =	2182		
2300 -	▲ P above 45 ■ P below	p; (kPa) =	2182		
2250 -		p (kPa) =	2102	n_(kPa)=	2184
	35	$p_{p}(\mathbf{x} \mathbf{a}) = 0$	4 67E 04	ρ _F (κι α) –	2104
2200		Q _p (m /s)= tp (s) =	4.07E-04	t_ (c) =	1200
2150 -	ato [imir	$\frac{(p(s))}{2}$	1.00E.06	(F(3)) =	1.00E.06
9 9 2100 -	- 25 & 5 5	S el S (-)=	1.00E-06	S el S (-)=	1.00E-06
Down	- 20 ²	EC _w (mS/m)=			
2050 -	- 15	Temp _w (gr C)=	9.9		
2000 -	- 10	Derivative fact.=	0.02	Derivative fact.=	0.03
1950 -	- 5				
	1.00 1.20 1.40 1.60	Results		Results	
старует	rune [n]	Q/s (m ² /s)=	4.5E-05		
Log-Log plot incl. derivates- flo	w period	T _M (m ² /s)=	4.7E-05		
	-	Flow regime:	transient	Flow regime:	transient
Elanced time Pa		dt_1 (min) =	6.07	dt₁ (min) =	1.39
10 ³	10, ⁻¹ 10, ⁰	dt_2 (min) =	18.18	dt_2 (min) =	16.17
SKB Laxemar / KLX 04 205.34 - 225.34 / Chi	FlowDim Version 2.14b (c) Golder Associates	$T(m^2/s) =$	6.6E-05	$T(m^2/s) =$	8.1E-05
10 2	•	S(-) =	1 0E-06	S (-) =	1.0E-06
10 1	to -1	K ₋ (m/s) =	3.3E-06	$K_{1}(m/s) =$	4 0E-06
	• • 10 ⁻²	$S_{s}(1/m) =$	5.0E-08	$S_{(1/m)} =$	5.0E-08
10°	a a a a a a a a a a a a a a a a a a a	$O_{s}(m^{3}/D_{z})$		$O_{s}(1,1,1)$	2.4E-08
64 64	10 ⁻³ 10 ⁻⁴	C(m/Pa) = C(r) = -r		C(m/Pa) = C(r) = -r	2.4E-00
10 1	•	$C_{\rm D}(-) =$		$C_{\rm D}(-) =$	2.7 2 1 0
10 -2	• 10 [~]	ς (-) =	0	ς (-) =	1.0
	10 4	$T_{CRF}(m^2/s) =$		$T_{CPF}(m^2/s) =$	<u> </u>
10 ⁵ 10 ⁶ tD	10 ⁷ 10 ⁸ 10 ⁹	$S_{GRF}(-) =$		$S_{GRF}(-) =$	<u>├────</u>
		$D_{GRE}(-) =$		$D_{GRE}(-) =$	t
Log-Log plot incl. derivatives-	recovery period	Selected represe	entative param	neters.	
		dt₁(min) =	1.39	$C (m^{3}/P_{2}) =$	2.4E-08
Elapsed time [h]		$dt_1(\min) =$	16.17	$C(\Pi / Pa) = C_{D}(-) =$	2.7E+00
10 ² SKB Laxemar / KLX 04		$T_{1}(m^{2}(n)) =$	8 1E-05	ε() -	1.8
205.34 - 225.34 / Chir	(*)	$\Gamma_{T}(\Pi S) =$	0.1E 00	ς (-)	1.0
	to ²	S(-) = K(m/n) = -	1.0E-00		
· · · · · · · · · · · · · · · · · · ·		$R_s(11/s) =$	4.0E-00		
· · · · ·	·	$S_{s}(1/11) =$	5.0E-06		
	10 ¹	Comments:			. 10
	60 00	The recommended	transmissivity of	t 8.1E-5 m2/s was de	erived from the
10-1	10 °	quality. The confide	ence range for th	ie interval transmiss	ivity is
		estimated to be 4.01	E-5 to 9.0E-5 m2	2/s. The flow dimens	sion displayed
		during the test is 2.	The static press	ure measured at tran	sducer depth,
10 ⁻⁰ 10 ⁻¹ 10 ⁻¹ 10 ⁻⁰ 10 ⁻¹ 10 ⁻¹		was derived from the Horner plot to a val	ne CHir phase us lue of 2181.6 kP	sing straight line extra a.	apolation in the



	Test S	umr	narv Sheet			
Project:	Oskarshamn site investi	gation	Test type:[1]			Chir
Area:	Lax	xemar	Test no:			1
Borehole ID:	k	KLX04	Test start:			040830 07:53
Test section from - to (m):	245.38-265	5.38 m	Responsible for	Jörg Böhne		
Section diameter, 2·r _w (m):		0.076	Responsible for		Crist	ian Enachescu
Lincer plot O and p			test evaluation:		Deservent period	
Linear plot Q and p			Flow period		Recovery period	
2800 KLX04_245.38-265.38_040830_1_CHir_Q_r	<u>t</u>	1 ²⁵	Indata	2576	Indata	
2750 ·	P section Pabove		$p_0 (kPa) =$	2576		
2700 -	P below	- 20	р _і (кра) =	2576		2576
2650	N :		р _р (кРа) =	2777	р _F (кРа) =	2576
			$Q_p (m^3/s) =$	2./3E-04		1200
	4	te [[/min]	tp (s) =	1200	t _F (S) =	1200
2 2550 - 2		action Rat	Sel S (-)=	1.00E-06	S el S (-)=	1.00E-06
2500 ·		- 10 출	EC _w (mS/m)=	10.5		
2450 -			Temp _w (gr C)=	10.5		
2400 -		- 5	Derivative fact.=	0.02	Derivative fact.=	0.02
2350						
0.00 0.20 0.40 0.60 Els	0.80 1.00 1.20 apsed Time [h]	1.40	Results		Results	
			Q/s (m²/s)=	1.3E-05		
Log-Log plot incl. derivates-	flow period		T _M (m²/s)=	1.4E-05		
			Flow regime:	transient	Flow regime:	transient
10, ⁴ Elapsed time	a[h]	-	dt ₁ (min) =	0.43	dt₁ (min) =	0.58
10 - SKB Laxemar / KLX 04 245.38 - 265.38 / Chi	FlowDim Version 2.14b (c) Golder Associates		dt_2 (min) =	4.10	dt ₂ (min) =	9.05
		10 -1	T (m²/s) =	2.1E-05	T (m²/s) =	4.8E-05
10 1			S (-) =	1.0E-06	S (-) =	1.0E-06
			$K_s (m/s) =$	1.1E-06	$K_s (m/s) =$	2.4E-06
۰. ۴ ու «		10 ⁻²	$S_{s}(1/m) =$	5.0E-08	$S_{s}(1/m) =$	5.0E-08
440.01	the state of the s	nin(1/p/t).	C (m³/Pa) =	NA	C (m³/Pa) =	3.8E-09
	A A A A	₹ 10 ⁻³	C _D (-) =	NA	C _D (-) =	4.2E-01
10 -1	•		ξ(-) =	1.6	ξ(-) =	13.1
-	· · · · · · · · · · · · · · · · · · ·	10 -4	$T_{GRE}(m^2/s) =$		$T_{CPE}(m^2/s) =$	
0 0	10 10 10 10 10 10		$S_{GRF}(-) =$	1	$S_{GRF}(-) =$	
			D _{GRF} (-) =	1	D _{GRF} (-) =	
Log-Log plot incl. derivatives	- recovery period		Selected represe	entative paran	neters.	
			dt ₁ (min) =	0.43	C (m ³ /Pa) =	3.8E-09
Elapsed time	[h]		dt_2 (min) =	4.10	$C_{D}(-) =$	4.2E-01
10 2 SKB Laxemar / KLX 04 245.38 - 265.38 / CHir	FlowDim Version 2.14b (c) Golder Associates		$T_{T}(m^{2}/s) =$	2.1E-05	ξ(-) =	1.6
		300	S (-) =	1.0E-06		
3 - 50 - 40 - 40 - 40 - 40 - 40 - 40 - 40			$K_s(m/s) =$	1.1E-06		
10 1		10 2	$S_{s}(1/m) =$	5.0E-08		
			Comments:			L
di Qi		90 (Main	The recommended	transmissivity of	f 2.1E-5 m2/s was de	erived from the
10 °		10 ¹	analysis of the CHi	phase (inner zon	ne), which shows the	best data and
	in the second se		derivative quality.	The confidence i	ange for the interva	transmissivity
	··••	3	is estimated to be 9	.0E-6 to 4.0E-5	m2/s. The flow dime	ension
		10 °	transducer depth w	e test is 2. The s	the CHir phase using	rea at g straight line
10 ¹ 10 ² EDIC	10 ³ 10 ⁴ 10 ⁹		extrapolation in the	Horner plot to a	a value of 2574.6 kP	a.

	Test Sumr	nary Sheet			
Project:	Oskarshamn site investigation	Test type:[1]			Chir
Area:	Laxemar	Test no:			1
Borehole ID:	KLX04	Test start:			040830 09:53
Test section from - to (m):	265.38-285.38 m	Responsible for test execution:			Jörg Böhner
Section diameter, 2·r _w (m):	0.076	Responsible for		Cristi	an Enachescu
Linear plot Q and p		Flow period		Recovery period	
		Indata		Indata	
3000 KLX04_265.38-285.38_040830_1_CHir_Q_r	0.8	p ₀ (kPa) =	2772		
2950 · P section		p _i (kPa) =	2772		
2900 - Pabove Pelow	0.6	p _p (kPa) =	2976	p _F (kPa) =	2771
2850 -		$Q_{p} (m^{3}/s) =$	9.17E-06		
8 2800 ·		tp (s) =	1200	t _F (s) =	1200
2750 ·	0.4 2	S el S [*] (-)=	1.00E-06	S el S [*] (-)=	1.00E-06
8 2700 ·	Injectio	EC _w (mS/m)=		(/	
2650		Temp _w (gr C)=	10.9		
2600 -	+ 0.2	Derivative fact.=	0.02	Derivative fact.=	0.02
2550					
2500	0.0 0.60 0.80 1.00 1.20	Results		Results	
∟ mpr		Q/s (m ² /s)=	4.4E-07		
Log-Log plot incl. derivates- f	ow period	T _M (m²/s)=	4.6E-07		
		Flow regime:	transient	Flow regime:	transient
10 ⁻⁴ 10 ⁻³ Elapsed time	[h] 10 ⁻¹ 10 [°]	dt ₁ (min) =	1.73	dt ₁ (min) =	0.53
10 1 SKB Laxemar / KLX 04 265.38 - 285.38 / Chi	FlowDim Version 2.14b	dt_2 (min) =	16.17	dt ₂ (min) =	6.87
	(c) Golder Associates	T (m²/s) =	1.1E-06	T (m²/s) =	1.7E-06
		S (-) =	1.0E-06	S (-) =	1.0E-06
10 **	0.3	$K_s (m/s) =$	5.3E-08	K _s (m/s) =	1.7E-08
	10 ⁻¹	$S_{s}(1/m) =$	5.0E-08	S _s (1/m) =	1.0E-08
1482.0146	l louiaj (Peji	C (m ³ /Pa) =	NA	C (m³/Pa) =	1.1E-10
10 -1	0.03 ਵੱ	C _D (-) =	NA	C _D (-) =	1.2E-02
	10 -2	ξ(-) =	1.2	ξ(-) =	14.9
		- (2)		- (2)	
10 ⁴ 10 ⁵	D 10 ⁶ 10 ⁷ 10 ⁸	$I_{GRF}(m^{-}/s) =$		$I_{GRF}(m^{-}/s) =$	
		$S_{GRF}(-) =$		$S_{GRF}(-) =$	
Les Les pletinet derivatives	wasawama naniad	$D_{\text{GRF}}(-) =$		$D_{\text{GRF}}(-) =$	
Log-Log plot incl. derivatives-	recovery period	Selected represe	ntative paran	eters.	
Elasted time Ibl		dt_1 (min) =	0.53	C (m ² /Pa) =	1.1E-10
10 ⁻⁴ 10 ⁻³ Explore internal 5KB Lavemar / KLX 04	10, ⁻¹ 10, ⁰	$dl_2(\Pi\Pi) =$	1 75 06	$C_{D}(-) =$	1.2E-02
265.38 - 285.38 / CHir	(c) Golder Associates	$I_{T}(m^{-}/s) =$	1.7E-06	ζ(-) =	14.9
-	300	S(-) =	1.0E-00		
10	10 2	κ_{s} (m/s) =	1.7E-08		
		$S_s(1/m) =$	1.0E-08		
	30 P		, ,		. 16 4
Į.	68 70 70	analysis of the CHir	ransmissivity of	1./E-0 m2/s was de	and derivative
quality. The confidence range for the interval transmissivity is				vity is	
	• • • ⁻	estimated to be 4.01	E-7 to $2.0E-6$ m ²	2/s. The flow dimens	ion displayed
		during the test is 2.	The static press	ure measured at tran	sducer depth,
10 ⁻¹ 10 ⁻² IDCD		was derived from th Horner plot to a val	e CHír phase us ue of 2771.1 kP	sing straight line extr a.	apolation in the





	Test Sur	nmary Sheet				
Project:	Oskarshamn site investigat	ion Test type:[1]			Chir	
Area:	Laxen	nar Test no:			1	
Borehole ID:	KLX	(04 Test start:			040826 06:30	
Test section from - to (m):	325.44-345	.44 Responsible for test execution:		Jörg Böhne		
Section diameter, $2 \cdot r_w$ (m):	0.0	76 Responsible for		Crist	ian Enachescu	
Linear plot Q and p		Flow period		Recovery period		
F		Indata		Indata		
3700 KLX04_325.44-345.44_040826_1_CHir_Q_r	1.0 P section	p₀ (kPa) =	3358			
	▲ P above * 0.9 ■ P below	p _i (kPa) =	3356		╉────┤	
3600 -	Q0.8	$p_{p}(kPa) =$	3556	p _F (kPa) =	3356	
3500 -	0.7	$O_{(m^{3}/s)} =$	2.43E-06			
e e	• 0.8 ·	$\frac{d_p(m/s)}{tp(s)} =$	1200	t _F (s) =	1200	
9 mm 9 34000 mm 9 3400 mm 9 3400 mm 9 3400 mm	0.5	Sel S [*] (_)=	1.00E-06	S el S [*] (-)=	1.00E-06	
d abot		§ EC (mS/m)=	1.002.00	3 el 3 (- <i>)</i> -	1.002.00	
8 3300 -	0.4	$Temp_{w}(ar C)=$	12.1			
		Derivative fact =	0.07	Derivative fact =	0.04	
3200 -			0.07		0.01	
	0.1					
3100 0.20 0.40 0.60	0.0 0.80 1.00 1.20 1.40 1.60	Results		Results		
Elap	sed lime [n]	Q/s $(m^{2}/s)=$	1.2E-07			
Log-Log plot incl. derivates- f	low period	$T_{M} (m^{2}/s) =$	1.2E-07			
		Flow regime:	transient	Flow regime:	transient	
10 ⁻⁴ 10 ⁻³ Elapsed time	[h]	dt ₁ (min) =	0.50	dt ₁ (min) =	1.26	
10 2 SKB Laxemar / KLX 04 325.44 - 345.44 / Chi	FlowOlm Version 2.14b (c) Golder Associates	² dt ₂ (min) =	8.27	dt ₂ (min) =	10.28	
		$T(m^{2}/s) =$	8.8E-08	T (m ² /s) =	1.0E-06	
10 1		S (-) =	1.0E-06	S (-) =	1.0E-06	
	10	$K_s (m/s) =$	4.4E-09	K _s (m/s) =	5.2E-08	
	47 F	$S_{s}(1/m) =$	5.0E-08	S _s (1/m) =	5.0E-08	
10 °	10	[°] ^w C (m ³ /Pa) =	NA	C (m ³ /Pa) =	7.3E-11	
:		^g C _D (-) =	NA	C _D (-) =	8.0E-03	
10 -1	10	ξ(-) =	-2.5	ξ(-) =	32.4	
		2		2		
10 ° 10 1	10 ² 10 ³ 10 ⁴	$T_{GRF}(m^2/s) =$		$T_{GRF}(m^2/s) =$	┫	
		$S_{GRF}(-) =$		$S_{GRF}(-) =$	 	
Log Log plot incl. dorivativos	rocovory pariod	D _{GRF} (-) -	ntativo naran	D _{GRF} (-) -		
Log-Log plot men denvatives	recovery period	dt. (min) -			7 3⊑ 11	
-t -J Elapsed time	nj , o	$dt_1(min) =$	8.27	$C(m/Pa) = C_{2}(r) =$	8.0E-03	
10 3 55.44 - 35.44 / Chir	FlowDim Version 2.14b (c) Golder Associates	$T_{2}(m^{2}(n)) =$	8.8E-08	ε() –	-2 5	
	10	$T_{T}(m/s) = $	1.0E-00	ς (-) –	-2.0	
10 2		$K_{(m/s)} =$	1.0E-00		╉────┤	
	10	$S_{s}(1/m) =$	5.0E-08		╉────┤	
10		Comments:	0.0∟-00		L	
	10	The recommended	transmissivity of	f 8.8E-8 m2/s was de	erived from the	
10	· · ·	analysis of the CHi	phase, which sh	ows the best data an	d derivative	
. 43	10	° quality. The confid	ence range for th	e interval transmiss	ivity is	
10		estimated to be 7.0	E-8 to 2.0E-7 m2	2/s. The flow dimens	sion displayed	
	10	during the test is 2.	The static press	ure measured at tran	sducer depth, rapolation in the	
10 ¹ 10 ² 10	10 ⁻³ 10 ⁻⁴ 10 ⁻⁵ 20	Horner plot to a val	lue of 3355.9 kP	a.	apolation in the	

	Test Sumr	narv Sheet			
Project:	Oskarshamn site investigation	Test type:[1]			Chir
Area:	Laxemar	Test no:			1
Borehole ID:	KLX04	Test start:			040826 08:37
Test section from - to (m):	345.44-365.44 m	Responsible for test execution:	Jörg Böhn		
Section diameter, 2·r _w (m):	0.076	Responsible for		Crist	an Enachescu
Linear plot Q and p		Flow period		Recovery period	
		Indata		Indata	
3800 KLX04_345.44-365.44_040826_1_CHir_Q_r	14	p ₀ (kPa) =	3354		r
3750 -	P section P above	p _i (kPa) =	3550		├ ───┤
3700 -		$p_{p}(kPa) =$	3750	p _F (kPa) =	3553
3650 -		$O_{(m^{3}/s)} =$	1.56E-04		
हु 3600		$\frac{dp}{dp}$ (m / c) =	1200	t _F (s) =	1200
9 JIN 80 3550	a set	Sel S [*] (-)=	1.00E-06	S el S [*] (-)=	1.00E-06
9500 J	a letto	EC _w (mS/m)=		000(-)-	
8 300	•	Temp _w (ar C)=	12.4		├ ───┤
3450 -	- 4	Derivative fact =	0.02	Derivative fact =	0.11
3400 -			0.02	Bonnatino haot.	0.11
3350					╂────┤
3300 0.20 0.40 0.60	0.80 1.00 1.20 1.40	Results		Results	<u> </u>
Elapi	ed Time [h]	$\Omega/s (m^2/s) =$	7.7E-06		r
Log-Log plot incl. derivates- fl	ow period	$T_{\rm M} (m^2/s) =$	8.0E-06		┢────┤
	••••	Flow regime:	transient	Flow regime:	transient
		dt₁ (min) =	2.67	dt₁ (min) =	1.46
Elapsed time (t	1 	dt_2 (min) =	18.17	dt_2 (min) =	15.37
345.44 - 365.44 / Chi	(c) Golder Associates	$T(m^2/s) =$	1.7E-05	$T(m^2/s) =$	5.6E-05
10 2	[10 °	S (-) =	1.0E-06	S (-) =	1.0E-06
* * *		$K_s(m/s) =$	8.6E-07	$K_s(m/s) =$	2.8E-06
10 1	10 -1	$\frac{S_{s}(1/m)}{S_{s}(1/m)} =$	5.0E-08	$S_{s}(1/m) =$	5.0E-08
o. (1980)	(internet)	$C_{(m^{3}/Pa)} =$	NA	$C_{(m^{3}/Pa)} =$	5.0E-09
² 10 °	10 b) b) b) b) b) b) b) b) b) b) b) b) b)	$C_{\rm D}(-) =$	NA	$C_{\rm D}(-) =$	5.5E-01
		ξ(-) =	5.0	ξ(-) =	30.2
10 -1	• •	5.()		5.()	
		$T_{GPE}(m^2/s) =$		$T_{CPE}(m^2/s) =$	
10 ⁹ 10 ¹⁰ 10	10 ^{-11[°]} 10 ^{-12[°]} 10 ^{-13[°]}	$S_{GRF}(-) =$		$S_{GRF}(-) =$	i1
		D _{GRF} (-) =		D _{GRF} (-) =	
Log-Log plot incl. derivatives-	recovery period	Selected represe	ntative param	neters.	
		dt ₁ (min) =	1.46	C (m ³ /Pa) =	5.0E-09
Elapsed time	[ħ]	dt ₂ (min) =	15.37	C _D (-) =	5.5E-01
10 - SKB Laxemar / KLX 04 345.44 - 365.44 / Chir	FlowDim Version 2.14b (c) Golder Associates	$T_{T}(m^{2}/s) =$	5.6E-05	ξ(-) =	30.2
	10 3	S (-) =	1.0E-06		
······		$K_s (m/s) =$	2.8E-06		
	10 ²	S _s (1/m) =	5.0E-08		
		Comments:			
10 °		The recommended	ransmissivity of	f 5.6E-5 m2/s was de	erived from the
	a	analysis of the CHin	phase, which sl	hows the best data a	nd derivative
10 -1	10	quality. The confide	ence range for the F_{-6} to $6.0F_{-5}$ m ²	the interval transmiss	vity is
		during the test is 2	The static press	ure measured at tran	sducer denth
10 ¹ 10 ²	10 ³ 10 ⁴ 10 ⁵	was derived from th	e CHir phase us	sing straight line ext	rapolation in the
D/C	20	Horner plot to a val	ue of 3551.2 kP	a.	

	Test Su	ımn	nary Sheet			
Project:	Oskarshamn site investiga	ation	Test type:[1]			Chir
Area:	Laxe	emar	Test no:			1
Borehole ID:	KL	_X04	Test start:			040826 10:38
Test section from - to (m):	365.47-385.4	47 m	Responsible for test execution:			Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0	0.076	Responsible for		Crist	ian Enachescu
Linear plot Q and p	<u> </u>		test evaluation:		Recovery period	
			Indata		Indata	
4000	KLX04_365.47-385.47_040826_1_CHir_Q_r	0.9	p ₀ (kPa) =	3749		
3950 •		0.8	p _i (kPa) =	3748		
3900	P section	0.7	p _p (kPa) =	3950	p _F (kPa) =	3748
3850 -	P below	0.6	$Q_{p}(m^{3}/s) =$	6.80E-06		
g 3800	•	[nin]	tp(s) =	1200	t _F (s) =	1200
3750		n Rate []^ 90	S el S [*] (-)=	1.00E-06	S el S [*] (-)=	1.00E-06
8 3700 ·		0.4 lujectio	EC _w (mS/m)=		()	
3650	 + '	0.3	Temp _w (gr C)=	12.7		
3800	+	0.2	Derivative fact.=	0.09	Derivative fact.=	0.03
3650		0.1				
3500		0.0	Beeulte		Deculto	
0.00 0.20 0.40 0.60 Elap	0.80 1.00 1.20 1.40 1.60 sed Time [h])		2 25 07	Results	
Log Log plot incl. derivator, f	low pariod		Q/s (m ⁻ /s)=	3.3E-07		
Log-Log plot lifel. derivates- i	low period		I _M (m ⁻ /s)=	3.5E-07	Flow regime:	transiant
			riuw regime.		riuw regime.	
Elapsed time	[h]		$dt_1(min) =$	0.92	$dt_1(min) =$	2.46
SRE Laxemat / KLX U4 365.47 - 385.47 / Chi	FlowDim Version 2.14b (c) Golder Associates	10 1	$T_{2}(1111) = T_{2}(1111)$	5.04 6.4E-07	$d_{2}(1111) =$	2.40 2.2E-06
			1 (m/s) =	0.4E-07	1 (m/s) =	1.0E-06
10		10 0	S (-) =	1.0E-00 3.2E-08	S(-) =	1.0E-00
			$S_{a}(1/m) =$	5.0E-08	$S_{s}(1/m) =$	5.0E-08
10010 00	A Charles and the	ć (mint)	$C_{s}(m^{3}/P_{2}) =$	NA	$C_{s}(m^{3}/P_{2}) =$	1.5E-10
2 · · · · · · · · · · · · · · · · · · ·		10 st) byt	$C(III / Fa) = C_{D}(-) =$	NA	$C(\Pi / Pa) = C_{D}(-) =$	1.6E-02
10 '1	- -		٤ (-) =	4.6	٤ (-) =	32.0
	11	10 -2	· / / د	-	· /) د	
40. ⁷ 40. ⁸	40 ^{.9} 40 ^{.10} 40 ^{.11}		$T_{GRE}(m^2/s) =$		$T_{GRF}(m^2/s) =$	
10 10 1	2 10 10 10		$S_{GRF}(-) =$		$S_{GRF}(-) =$	
			D _{GRF} (-) =		D _{GRF} (-) =	
Log-Log plot incl. derivatives	- recovery period		Selected represe	entative param	neters.	
			dt ₁ (min) =	0.92	C (m ³ /Pa) =	1.5E-10
Elapsed time	[h] 2,	,	dt ₂ (min) =	9.64	C _D (-) =	1.6E-02
10 - SKB Laxemar / KLX 04 365.47 - 385.47 / Chir	FlowDim Version 2.14b (c) Golder Associates		$T_{T} (m^{2}/s) =$	6.4E-07	ξ(-) =	4.6
		10 3	S (-) =	1.0E-06		
10 2			$K_s (m/s) =$	3.2E-08		
		. 2	S _s (1/m) =	5.0E-08		
10 10 1		12 [Ray]	Comments:			
	»	0649,7044	The recommended the analysis of the CHi quality. The confide estimated to be 2.01 during the test is 2. was derived from the test is 2.	transmissivity of phase, which sh ence range for th E-7 to 8.0E-7 m ² The static press ne CHir phase us	6.6.4E-7 m2/s was do ows the best data an e interval transmissi 2/s. The flow dimension ure measured at tran- ting straight line extra	rived from the d derivative ivity is sion displayed sducer depth, rapolation in the
10 10 ⁻ 10 10 10 10 10 10 10 10 10 10 10 10 10	טי 10 10 ^{°°} בנ		Horner plot to a val	ue of 3748.2 kP	a.	











	Test Summ	nary Sheet			
Project:	Oskarshamn site investigation	Test type:[1]			Pi
Area:	Laxemar	Test no:			1
Borehole ID:	KLX04	Test start:			040827 06:38
Test section from - to (m):	485.52-505.52 m	Responsible for test execution:			Jörg Böhner
Section diameter, 2·r _w (m):	0.076	Responsible for		Crist	ian Enachescu
Linear plot Q and p		Flow period		Recovery period	
		Indata		Indata	
5200	KLX04_485.52-505.52_040827_1_CHir_Q_r	p₀ (kPa) =	4928		
5150		p _i (kPa) =	4929		
5100 -	P section O.4 Pabove	p _p (kPa) =	5131	p _F (kPa) =	4932
5050 -	P below	Q _p (m ³ /s)=	-		
\$ 5000 ·	1 0.3 <u>F</u>	tp (s) =	-	t _F (s) =	2400
4950		S el S [*] (-)=	-	S el S [*] (-)=	1.00E-06
0 4900	0.2 ^{to}	EC _w (mS/m)=			
4850 -		Temp _w (gr C)=	14.6		
4800 -	• 0.1	Derivative fact.=	-	Derivative fact.=	0.10
4750 -					
4700 .00 0.20 0.40 0.60 0.80 Elapse	1.00 1.20 1.40 1.60 1.80 2.00 ad Time [h]	Results		Results	
		Q/s (m²/s)=	NA		
Log-Log plot incl. derivates- fl	ow period	T _M (m²/s)=	NA		
		Flow regime:	transient	Flow regime:	transient
		dt ₁ (min) =	-	dt ₁ (min) =	*
		dt_2 (min) =	-	dt ₂ (min) =	*
		T (m²/s) =	NA	T (m²/s) =	2.1E-10
		S (-) =	NA	S (-) =	1.0E-06
		$K_s (m/s) =$	NA	$K_s (m/s) =$	1.1E-11
Not Ar	nalysed	$S_{s}(1/m) =$	NA	$S_{s}(1/m) =$	5.0E-08
		C (m³/Pa) =	NA	C (m³/Pa) =	3.0E-11
		$C_D(-) =$	NA	$C_D(-) =$	3.3E-03
		ξ(-) =	NA	ξ(-) =	1.6
		0		0	
		$T_{GRF}(m^2/s) =$		$T_{GRF}(m^2/s) =$	
		S _{GRF} (-) =		$S_{GRF}(-) =$	
		$D_{GRF}(-) =$		$D_{GRF}(-) =$	
Log-Log plot Incl. derivatives-	recovery period	Selected represe	ntative param	neters.	2.05.11
Financial States Mark		$dl_1(min) =$	*	C (m°/Pa) =	3.0E-11
10 ⁻⁴ 5KB Laxemar / KLX 04	μ 	$dl_2(mm) =$	2 1 - 10	$C_{\rm D}(-) =$	3.3E-03 1.6
485.52 - 505.52 / Pi	(c) Golder Associates 0.3	$I_{T}(m^{-}/s) =$	2.1E-10 1.0E-06	ς(-) =	1.0
· · · · · · · · · · · · · · · · · · ·		S(-) = K(m/n) = -			
10 0	10	$R_{s}(11/3) =$	5.05.08		
	0.03	$S_{s}(mn) =$	J.UL-00		
		The recommended t	ransmissivity de	erived from the analy	usis is $2.1F_{-10}$
10-1		m2/s. It should be n	oted that due to	the very low interva	l transmissivity
	• • • • • • • • • • • • • • • • • • •	the results are very	uncertain. The c	onfidence range for	the interval
•	***	transmissivity is est	imated to be 1.0	E-10 to 1.0E-9 m2/s	s. The analysis
40 ¹	10 ⁻³	was conducted using derived.	g a now dimens	ion of 2. No static p	ressure could be
10 10 10	ıd 10 10 ⁻				

	Test Sumr	nary Sheet			
Project:	Oskarshamn site investigation	Test type:[1]			Chir
Area:	Laxemar	Test no:			1
Borehole ID:	KLX04	Test start:			040827 09:11
Test section from - to (m):	505.55-525.55 m	Responsible for test execution:			Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for		Crist	ian Enachescu
Linear plot Q and p		Flow period		Recovery period	
		Indata		Indata	
5400	5.0 KLX04_505.55-525.55_040827_1_CHir_Q_r	p₀ (kPa) =	5117		
	4.5	p _i (kPa) =	5117		
	P section 4.0	$p_p(kPa) =$	5317	p _F (kPa) =	5117
5200	P below 	$Q_{n} (m^{3}/s) =$	3.08E-05		
	- ³⁰ Ţ	tp(s) =	1200	t _F (s) =	1200
5100	2.5 82	S el S [*] (-)=	1.00E-06	S el S [*] (-)=	1.00E-06
alo the second se	0 9 20 2	$EC_w (mS/m) =$			
5000		Temp _w (ar C)=	15.0		
	1.5	Derivative fact.=	0.19	Derivative fact.=	0.05
4900	1.0				
I I III	+ 0.5				
4800	0.0 0.80 1.00 1.20 1.40 1.60	Results		Results	
Elap	sed Time [h]	Q/s $(m^{2}/s)=$	1.5E-06		
Log-Log plot incl. derivates- f	low period	$T_{\rm M} (m^2/s) =$	1.6E-06		
	-	Flow regime:	transient	Flow regime:	transient
Elapsed time	[h]	dt_1 (min) =	0.77	dt_1 (min) =	0.38
10 2 5KB Laxemar / KLX 04 505.55 - 525.55 / Chi	10, 10, 10, FowDim Version 2.14b	dt_2 (min) =	2.63	dt_2 (min) =	1.55
	(c) Course Haddings	$T(m^{2}/s) =$	2.1E-06	$T(m^{2}/s) =$	2.1E-06
10 ¹	10 °	S (-) =	1.0E-06	S (-) =	1.0E-06
•••		$K_s (m/s) =$	1.1E-07	$K_s (m/s) =$	1.0E-07
· · ·	10 -1	$S_{s}(1/m) =$	5.0E-08	$S_{s}(1/m) =$	5.0E-08
dk1) 10 ⁰	The second s	$C (m^{3}/Pa) =$	NA	$C (m^{3}/Pa) =$	4.3E-10
		$C_{D}(-) =$	NA	$C_{\rm D}(-) =$	4.8E-02
10 -1	•	ξ(-) =	1.7	ξ(-) =	1.5
1	10 ⁻³	$T_{CPF}(m^2/s) =$		$T_{CPF}(m^2/s) =$	
10 10 t	10 10 10 10 D	$S_{GRF}(-) =$		$S_{GRF}(-) =$	
		$D_{GRF}(-) =$		$D_{GRF}(-) =$	
Log-Log plot incl. derivatives	recovery period	Selected represe	ntative param	neters.	
		dt₁ (min) =	0.38	C (m ³ /Pa) =	4.3E-10
10 ⁻⁴ 10 ⁻³ Elapsed tim	ν [N] 10 ⁻²	dt ₂ (min) =	1.55	$C_{D}(-) =$	4.8E-02
10 ² SKB Laxemar / KLX 04 505.55 - 525.55 / Chir	FlowDim Version 2.14b (c) Golder Associates	T _⊤ (m²/s) =	2.1E-06	ξ(-) =	1.5
	10	S (-) =	1.0E-06	• • • •	
10 1		$K_s (m/s) =$	1.0E-07		
	10 ²	S _s (1/m) =	5.0E-08		
8		Comments:			•
	2 Georgian 2 Contraction 2 Con	The recommended	ransmissivity of	f 2.1E-6 m2/s was de	erived from the
		analysis of the CHin	phase, which sl	hows the best data a	nd derivative
10 -1		quality. The confide	ence range for the 7.7 ± 2.0	e interval transmiss	ivity is
	10 °	estimated to be 9.01 during the test is 2	5-7 to 3.0E-6 m² The static press	2/s. The flow dimens	sion displayed
10.0 10.1	2 10 ³ 10 ⁴ 10 ⁵	was derived from th	e CHir phase us	sing straight line extra	rapolation in the
10 טי טי כא	CD 10 10	Horner plot to a val	ue of 5115.3 kP	a.	

Test Summary Sheet					
Project:	Oskarshamn site investigatio	n <u>Test type:[1]</u>			Pi
Area:	Laxema	ar Test no:			1
Borehole ID:	KLX0	4 Test start:			040827 11:14
Test section from - to (m):	525.58-545.58 r	n Responsible for test execution:			Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.07	6 Responsible for		Crist	ian Enachescu
Linear plot O and p		test evaluation:		Pacovonu porios	
Linear plot & and p		Flow period		Recovery period	
5700 KLX04_525.58-545.58_04	0.50	n_{o} (kPa) =	5320	inuata	r – – – – – – – – – – – – – – – – – – –
5800	P above - 0.45 P below	p ₀ (kPa) =	5320		╂───┤
	- 0.40	$p_{\rm p}({\rm kPa}) =$	5520	p₌ (kPa.) =	5336
5500 -	0.35	$O_{\mu}(m^3/s) =$	-		5550
E 5400	+ 0.30 Ē	$\frac{d_p(m/s)}{tp(s)} =$	-	t _F (s) =	4800
Jan State St	0.25	S el S [*] (-)=	1.00E-06	S el S [*] (-)=	1.00E-06
5300	10,20 0,20	$EC_w (mS/m) =$			
	0.15	Temp _w (gr C)=	15.3		
5200	- 0.10	Derivative fact.=	-	Derivative fact.=	0.05
5100	- 0.05				
5000	1.50 2.00 2.50 3.00	Results		Results	
Elaps	ed Time [h]	Q/s (m ² /s)=	NA		
Log-Log plot incl. derivates- f	low period	$T_{M} (m^{2}/s) =$	NA		
		Flow regime:	transient	Flow regime:	transient
		dt ₁ (min) =	-	dt ₁ (min) =	1.79
		dt ₂ (min) =	-	dt ₂ (min) =	16.77
		T (m²/s) =	NA	T (m²/s) =	4.1E-10
		S (-) =	NA	S (-) =	1.0E-06
		$K_{s}(m/s) =$	NA	$K_s (m/s) =$	2.0E-11
Not At	nalysed	$S_{s}(1/m) =$	NA	S _s (1/m) =	5.0E-08
		C (m³/Pa) =	NA	C (m³/Pa) =	3.4E-11
		C _D (-) =	NA	C _D (-) =	3.7E-03
		ξ(-) =	NA	ξ(-) =	3.3
		$T_{opr}(m^2/s) =$		$T_{opr}(m^2/s) =$	
		$S_{GRF}(-) =$		$S_{GRF}(-) =$	
		$D_{GRF}(-) =$		$D_{GRF}(-) =$	
Log-Log plot incl. derivatives-	recovery period	Selected represe	entative param	neters.	
		dt ₁ (min) =	1.79	C (m³/Pa) =	3.4E-11
-3 - Elapsed time	NJ 1	dt_2 (min) =	16.77	C _D (-) =	3.7E-03
10 ² SKB Laxemar / KLX 04		$T_{T} (m^{2}/s) =$	4.1E-10	ξ(-) =	3.3
525.58 - 545.58 / Pi	(c) Golder Associates	S (-) =	1.0E-06		
10 1		$K_s (m/s) =$	2.0E-11		
0 0 % 0 00 111 00 million	10 -1	$S_s(1/m) =$	5.0E-08		
8		Comments:			
		The recommended	transmissivity of base. Considerin	f 4.1E-10 m2/s was of a the inherent uncer	derived from the tainties related
	10 ⁻²	to the measurement	(e.g. specially t	he measurement of t	he wellbore
10 -1		storage coefficient)	and to the analy	vsis process (e.g. nur	meric distortion
	10 -3	when calculating th	e derivative and	pressure history eff	ects), the $7E_{11}$ to $7E_{22}$
10 ⁻³ 10 ⁻⁴	10 ⁵ 10 ⁶ 10 ⁷	10 m2/s (the outer z	zone transmissiv	ity is considered as	most
		representative). The	flow dimension	displayed during th	e test is 2. No
		static pressure coul	d he derived.		

-	Test	Sumr	nary Sheet	Ĩ		2 11
Project:	Oskarshamn site inves	stigation	Test type:[1]			Chir
Area:	L	axemar	Test no:			2
Borehole ID:		KLX04	Test start:			040827 19:34
Test section from - to (m):	545.62-56	545.62-565.62 m				Jörg Böhner
Section diameter 2·r (m):		0.076	test execution:	Criatian Engehange		
		0.070	test evaluation:		Onat	
Linear plot Q and p			Flow period		Recovery period	1
5800		0.010	Indata		Indata	
	KLX04_545.62-565.62_040827_2_CHir_Q_r	+ 0.009	p ₀ (kPa) =	5513		
5750 -		0.009	p _i (kPa) =	5517		
	P section	0.005	p _p (kPa) =	5721	p _F (kPa) =	5517
5700 -	▲ P above ■ P below	- 0.007	Q _p (m ³ /s)=	5.72E-08		
sur e [kP a		- 0.006 [uiu]	tp (s) =	1200	t _F (s) =	1800
8 5650 9		- 0.005 B	S el S [°] (-)=	1.00E-06	S el S (-)=	1.00E-06
	4 A	- 0.004 ^출	EC _w (mS/m)=			
5600 -	~1	- 0.003	Temp _w (gr C)=	15.7		
5560		- 0.002	Derivative fact.=	0.14	Derivative fact.=	
		0.001			-	
0.00 0.20 0.40	0.60 0.80 1.00 Elapsed Time [h]	1.20	Results	0.75.00	Results	
Les Les aletinet derivet	a flow noticed		$Q/s (m^{2}/s) =$	2.7E-09		
Log-Log plot incl. derivate	es- flow period		T _M (m²/s)=	2.9E-09	Flow regime:	transiant
			Flow regime:		Flow regime:	transient *
10 ²	Elapsed time [h] .101 ⁻²		$dl_1 (min) =$	2.93	$dt_1 (min) =$	*
SKB Laxemar / KLX 04 545.62 - 565.62 / Chi	FlowDim Version 2. (c) Golder Associat	.14b Ies	$dt_2(11111) =$	14.40 1 3E_09	$T_{12}(m^{2}/c) =$	8 3E-09
10 1		10 3	1 (m/s) = S(-) =	1.0E-06	S(-) =	1.0E-06
	and and an international states in the state of the states in the states		$K_{a}(m/s) =$	6.6E-11	$K_{a}(m/s) =$	4 2E-10
10 °		10 2	$S_{c}(1/m) =$	5.0E-08	$S_{s}(1/m) =$	5.0E-08
(Gen)		[[mint]]	$C_{\rm m}(m^3/Pa) =$	NA	$C_{\rm s}(m^3/P_{\rm Pa}) =$	7.4E-11
₩ 10 ⁻¹	· · ·	10 ¹ by)	$C_{D}(-) =$	NA	$C_{D}(-) =$	8.2E-03
			$\xi(-) =$	-0.9	ξ(-) =	9.3
10 -2		10 °	5()		5()	
· · · · · · · · · · · · · · · · · · ·	,		T _{GRF} (m ² /s) =		T _{GRF} (m ² /s) =	
10 -	10 10 10 10	10 - 10	$S_{GRF}(-) =$		$S_{GRF}(-) =$	
			D _{GRF} (-) =		D _{GRF} (-) =	
Log-Log plot incl. derivati	ives- recovery period		Selected represe	entative param	neters.	
			$dt_1 (min) =$	2.93	C (m³/Pa) =	7.4E-11
			dt_2 (min) =	14.40	C _D (-) =	8.2E-03
10 ⁻³	lapsed time [h]		$T_{T} (m^{2}/s) =$	1.3E-09	ξ(-) =	-0.9
		10 3	S (-) =	1.0E-06		
			$K_s (m/s) =$	6.6E-11		
	\leq	10 2	$S_s(1/m) =$	5.0E-08		
A. S. B. B. B. B. B. B. B. B. B. B. B. B. B.			Comments:			
	hit .	[Red 2] 10	*: IARF not measur The recommended	ed transmissivity of	F1 3F-9 m2/s was d	erived from the
		2 de 1	analysis of the CHi	phase, because	during the CHir pha	se no infinite
10-1		ł	acting radial flow w	as measured, so	that the results for	the
•		10 0	transmissivity are v	ery uncertain. The provident of the prov	he confidence range E_{10} to $2.0E_{10}$ m ²	tor the interval
			dimension displayer	d during the test	is 2. The static pres	s. The now ssure measured
10 ⁰ 10 ¹	10 ² 10 ³	10 4	at transducer depth,	was derived fro	m the CHir phase u	sing straight
			line extrapolation in	n the Horner plot	t to a value of 5509	.9 kPa.
			<u> </u>			



Test Summary Sheet							
Project:	Oskarshamn site investigation	Test type:[1]			Chir		
Area:	Laxemar	Test no:			1		
Borehole ID:	KLX04	Test start:			040828 00:07		
Test section from - to (m):	585.65-605.65 m	Responsible for test execution:			Jörg Böhner		
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for		Crist	an Enachescu		
Linear plot Q and p		Flow period		Recovery period			
		Indata	Indata				
KLX04_585.65-605.65_040828_1_CHir_Q_r	P section	p ₀ (kPa) =	5907				
6100	▲ P above ■ P below	p _i (kPa) =	5904				
	q 2.0	p _p (kPa) =	6104	p _F (kPa) =	5905		
6000 -		$Q_{p} (m^{3}/s) =$	2.07E-05				
	1.5 ਵੂ	tp(s) =	1200	t _F (s) =	600		
5900		S el S [*] (-)=	1.00E-06	S el S [*] (-)=	1.00E-06		
ntoit	원 1.0 ^호	EC _w (mS/m)=					
5800 -		Temp _w (gr C)=	16.3				
		Derivative fact.=	0.09	Derivative fact.=	0.02		
5700							
5600 0.00 0.20 0.40 0.60	0.80 1.00 1.20 1.40	Results		Results			
Elaps	id Time [h]	Q/s $(m^{2}/s)=$	1.0E-06				
Log-Log plot incl. derivates- fl	ow period	$T_{M} (m^{2}/s) =$	1.1E-06				
		Flow regime:	transient	Flow regime:	transient		
Elapsed time [19	dt_1 (min) =	1.58	dt ₁ (min) =	*		
10 ² SKB Laxemar / KLX 04	10	dt_2 (min) =	14.88	dt ₂ (min) =	*		
363.65 - 603.837 Gill	(c) Golder Associates	$T(m^{2}/s) =$	1.2E-06	$T(m^{2}/s) =$	5.2E-06		
10 1	10 °	S (-) =	1.0E-06	S (-) =	1.0E-06		
• • • • • • • • • • • • • • • • • • • •		$K_s (m/s) =$	5.9E-08	$K_s (m/s) =$	2.6E-07		
	;	S _s (1/m) =	5.0E-08	S _s (1/m) =	5.0E-08		
10 ⁰	10 ⁻¹ Equip	C (m ³ /Pa) =	NA	C (m ³ /Pa) =	9.3E-10		
		C _D (-) =	NA	$C_{D}(-) =$	1.0E-01		
10 -1	10 -2	ξ(-) =	-0.5	ξ(-) =	0.0		
		$T_{GRF}(m^2/s) =$		$T_{GRF}(m^2/s) =$			
10 10 tC	10 10 10	$S_{GRF}(-) =$		$S_{GRF}(-) =$			
		D _{GRF} (-) =		D _{GRF} (-) =			
Log-Log plot incl. derivatives-	recovery period	Selected represe	entative paran	ieters.			
		dt ₁ (min) =	1.58	C (m³/Pa) =	9.3E-10		
10 -4 10 -3 Elapsed time	[b] 10 ⁻² 10 ⁻¹	dt_2 (min) =	14.88	C _D (-) =	1.0E-01		
10 2 SKB Laxemar / KLX 04	FlowDim Version 2.14b (c) Golder Associates	$T_{T} (m^{2}/s) =$	1.2E-06	ξ(-) =	-0.5		
	10 ³	S (-) =	1.0E-06				
10 .		$K_s (m/s) =$	5.9E-08				
10 ° · · · ·	10 IV	S _s (1/m) =	5.0E-08				
g	10' F	Comments:					
[™] · · · · · · · · · · · · · · · · · · ·							
	- 2 10 °	The recommended	transmissivity of	f 1.2E-6 m2/s was de	erived from the		
10 -2		analysis of the CHi	phase, which sh	ows the best derivat	ive quality. The		
	to ⁻¹	7 to $4.0E-6 \text{ m}^2/\text{s}$ T	he flow dimensi	on displayed during	the test is 2		
10 ° 10	1 10 ² 10 ³	The static pressure	measured at trar	isducer depth, was d	erived from the		
tion	α.	CHir phase using st value of 5904 6 kPs	raight line extra	polation in the Horn	er plot to a		

Test Summary Sheet							
Project: Os	karshamn site investig	ation	Test type:[1]	Chir			
Area:	Laxe	emar	Test no:			1	
Borehole ID:	KLX04		Test start:	040828 02:17			
Test section from - to (m):	605.69-625.69 m		Responsible for test execution:	Jörg Böhner			
Section diameter, 2·r _w (m):	0	0.076	Responsible for		Crist	ian Enachescu	
Linear plot Q and p			Flow period		Recovery period		
8950		40	Indata		Indata		
KLX04_605.69-625.69_040828_1_CHir_Q_r	Psection	4.0	p ₀ (kPa) =	6104			
6300	▲ P above ■ P below	3.5	p _i (kPa) =	6101			
6250 -	•	3.0	p _p (kPa) =	6301	p _F (kPa) =	6102	
6200 -			Q _p (m ³ /s)=	3.28E-05			
ق 150 مر		2.5 [ujuu/	tp (s) =	1200	t _F (s) =	1200	
8 6100 9		2.0 Kate	S el S [*] (-)=	1.00E-06	S el S [*] (-)=	1.00E-06	
8 6050 ·	•	lijecti 15	EC _w (mS/m)=				
6000 -			Temp _w (gr C)=	16.7			
5950 -	-	1.0	Derivative fact.=	0.10	Derivative fact.=	0.02	
5900		0.5					
5850 5850 5850 5850 5850 5850 5850 5850	1.00 1.20 1.40	0.0	Results		Results		
Elapsed Time [h]			Q/s (m ² /s)=	1.6E-06			
Log-Log plot incl. derivates- flow p	eriod		T_{M} (m ² /s)=	1.7E-06			
			Flow regime:	transient	Flow regime:	transient	
Elapsed time [h]			dt ₁ (min) =	0.20	dt ₁ (min) =	1.00	
10 ² SKB Laxemar /KLX 04	.10 ⁻¹ .10 ⁰ FlowDim Version 2.14b		dt ₂ (min) =	14.70	dt ₂ (min) =	5.93	
edis.teli - ezzisteli / Chi	(c) GOUEL ASSOCIATES		T (m²/s) =	3.0E-06	T (m²/s) =	7.3E-06	
10 1		10	S (-) =	1.0E-06	S (-) =	1.0E-06	
· ·			K _s (m/s) =	1.5E-07	K _s (m/s) =	3.7E-07	
•	•	10 -1	S _s (1/m) =	5.0E-08	S _s (1/m) =	5.0E-08	
		(Inim) to	C (m ³ /Pa) =	NA	C (m ³ /Pa) =	6.2E-10	
		10 ⁻¹⁰	C _D (-) =	NA	C _D (-) =	6.8E-02	
10 -1	•		ξ(-) =	3.8	ξ(-) =	19.8	
	-	10 -3	2		2		
10 ⁻⁷ 10 ⁻⁸ 10 ⁻⁹	10 10 10 10 11		$T_{GRF}(m^2/s) =$		$T_{GRF}(m^2/s) =$		
_			$S_{GRF}(-) =$		$S_{GRF}(-) =$		
	<u> </u>		$D_{GRF}(-) =$		$D_{GRF}(-) =$		
Log-Log plot incl. derivatives- reco	very period		Selected represe	entative paran	neters.		
			$dl_1(min) =$	0.20	C (m°/Pa) =	6.2E-10	
Elapsed time [h]			$dl_2(min) =$	14.70	$C_D(-) =$	0.8E-02	
10 SKB Laxemar / KLX 04 605.69 - 625.69 / Chir	FlowDim Version 2.14b (c) Golder Associates		$T_T (m^2/s) =$	3.0E-06	ξ(-) =	3.8	
	30	00	S (-) =	1.0E-06			
	110	D ²	$K_s (m/s) =$	1.5E-07			
10			$S_{s}(1/m) =$	5.0E-08			
	30	0 8	Comments:				
The recommended transmissivity of 3.0E-6 m2/s was derived from the							
analysis of the Critic phase, which shows the best data and derivative quality. It should be noted, that the results are uncertain due to the							
connection to the lower section. The confidence range for the interval					or the interval		
transmissivity is estimated to be 1.0E-6 to 6.0E-6 m2/s. The flow					The flow		
dimension displayed during the test is 2. The static pressure measured $\frac{1}{10^2}$						sure measured	
¹⁰ ¹⁰ ¹⁰ ¹⁰ ¹⁰ ¹⁰ ¹⁰ ¹⁰						9 kPa.	

Test Summary Sheet						
Project:	Oskarshamn site investigatio	n <u>Test type:[1]</u>			Chir	
Area:	Laxema	ir Test no:			1	
Borehole ID:	KLX0	4 Test start:	040828 06:37			
Test section from - to (m):	625.71-645.71 r	n Responsible for test execution:	Jörg Böhner			
Section diameter, $2 \cdot r_w$ (m):	0.07	6 Responsible for		Crist	ian Enachescu	
l inear plot Q and p		Flow period		Recovery period		
		Indata		Indata		
6550	KLX04_625.71-645.71_040828_1_CHir_Q_r	n. (kPa) -	6201	inuata		
6500 -		$p_0 (RPa) =$	6308			
6450 -	P section 2.5	р _і (кра) =	6298		(0.0	
6400 -		p _p (kPa) =	6499	р _F (кРа) =	6297	
	20	Q _p (m ³ /s)=	3.22E-05			
	i (im)	tp (s) =	1200	t _F (s) =	1200	
8 6300 B	1.5 2	S el S [*] (-)=	1.00E-06	S el S [*] (-)=	1.00E-06	
§ 6250 -	्य	EC _w (mS/m)=				
6200 -	• 1.0	Temp _w (gr C)=	17.0			
6150 -		Derivative fact.=	0.21	Derivative fact.=	0.10	
6100	- 0.5					
6050	0.80 1.00 1.20 1.40	Pequite		Beaulta		
Elapsed	Time [h]			Results		
		Q/s (m²/s)=	1.6E-06			
Log-Log plot incl. derivates- fig	ow period	T _M (m²/s)=	1.6E-06			
		Flow regime:	transient	Flow regime:	transient	
Elapsed time [h 10_4 10_3 10_1	10 ⁻¹ 10.°	dt ₁ (min) =	1.70	dt ₁ (min) =	0.33	
10 ² SKB Laxemar / KLX 04 625.71 - 645.71 / Chi	FlowDim Version 2.14b (c) Golder Associates	dt_2 (min) =	4.73	dt_2 (min) =	1.78	
1		$T(m^{2}/s) =$	2.0E-06	T (m²/s) =	2.2E-06	
10 '	10 °	S (-) =	1.0E-06	S (-) =	1.0E-06	
		$K_s (m/s) =$	1.0E-07	$K_s (m/s) =$	1.1E-07	
	• 10 ⁻¹	$S_{s}(1/m) =$	8.3E-09	S _s (1/m) =	5.0E-08	
GPU 10 ********		C (m ³ /Pa) =	NA	C (m³/Pa) =	2.6E-10	
		C _D (-) =	NA	C _D (-) =	2.9E-02	
10 -1		ξ(-) =	0.9	ξ(-) =	1.9	
	÷					
	10 -3	$T_{CDF}(m^2/s) =$		$T_{cpr}(m^2/s) =$		
10 ⁴ 10 ² 10	10 ⁶ 10 ⁷ 10 ⁸	$S_{GRF}(-) =$		$S_{GRF}(-) =$		
		$D_{GRE}(-) =$		$D_{GRE}(-) =$		
Log-Log plot incl. derivatives-	recovery period	Selected represe	entative param	eters.		
		dt₁ (min) =	0.33	$C (m^3/P_0) =$	2 6E-10	
Elapsed time (4	dt_{0} (min) =	1 78	$C(\Pi/Pa) = C_{D}(-) =$	2.0E-02	
10 10 10 10 10 10 10 10 10 10 10 10 10 1	10_"	T_{1}	2.25-06	ε() –	1.0	
	(c) Golder Associates	$T_{T}(m/s) =$	1.0E.06	ς(-) –	1.5	
		3(-) =	1.02-00			
10		R_s (III/S) =	1.1E-07			
		$S_{s}(1/m) =$	5.0E-08			
		The recomments: analysis of the CHin quality. The confide estimated to be 1.01 during the test is 2. was derived from th Horner plot to a val	transmissivity of r phase, which sl ence range for th E-6 to 4.0E-6 m ² The static press ne CHir phase us ue of 6296.5 kP	f 2.2E-6 m2/s was do hows the best data a the interval transmiss 2/s. The flow dimensions ure measured at trans- sing straight line extra a.	erived from the nd derivative ivity is sion displayed sducer depth, rapolation in the	



	Test Sur	nmary Sheet				
Project:	Oskarshamn site investigat	ion <u>Test type:[1]</u>	est type:[1]			
Area:	Laxen	nar Test no:				
Borehole ID:	KLX	04 Test start:	040828 10:47			
Test section from - to (m):	665.76-685.76	m Responsible for		Jörg Böhner		
Section diameter, 2·r _w (m):	0.0	176 Responsible for		Cris	tian Enachescu	
Linear plot Q and p		Flow period		Recovery period	d	
		Indata		Indata	T	
6950	KLX04_665.76-685.76_040828_1_CHir_Q_r	n₀ (kPa) =	6692	indutu	T	
6900 -	- 0.9	p ₀ (kPa) =	6694			
6850 -	P section Pabove 0.8	$p_i(kPa) =$	6903	n_(kPa) =	6726	
6800	Q 0.7	$p_p(\mathbf{R} \mathbf{a}) =$	1 68E 06	p _F (Ki a) −	0720	
ā 6750 -		$Q_p (m^2/s) =$	1.08E-00	t (c) -	1200	
) o ne se la constance de la const		$\frac{ip(s)}{2} =$	1.00E.06	$l_F(S) =$	1.00E.06	
2 6 6/00 - 80 4	3 ^{0.5}	SelS (-)=	1.00E-00	S el S (-)=	1.00E-00	
å 6650 ·	- 0.4	$EC_w (IIIS/III) =$	17.7		+	
6600 -	+ 0.3	Temp _w (gr C)=	17.7		0.02	
650 -	- 0.2	Derivative fact.=	0.0	Derivative fact.=	0.02	
6500	0.1	_		_		
0.00 0.20 0.40 0.60 0.80 Elaps	1.00 1.20 1.40 1.60 1.80 red Time [h]	Results		Results		
		$Q/s (m^2/s)=$	7.9E-08			
Log-Log plot incl. derivates- fl	low period	$T_M (m^2/s) =$	8.3E-08			
		Flow regime:	transient	Flow regime:	transient	
Elapsed time (r	10 ⁻²	dt_1 (min) =	0.08	dt_1 (min) =	0.07	
10 SKB Laxemar / KLX 04 665.76 - 685.76 / Chi	FlowDim Version 2.14b (c) Golder Associates	dt_2 (min) =	0.23	dt_2 (min) =	0.22	
1	30	$T(m^{2}/s) =$	1.3E-07	T (m²/s) =	2.5E-07	
		S (-) =	1.0E-06	S (-) =	1.0E-06	
10 *	10'	$K_s (m/s) =$	6.3E-09	$K_s (m/s) =$	1.3E-08	
ġ.		$S_{s}(1/m) =$	5.0E-08	S _s (1/m) =	5.0E-08	
10 robu	A STATE OF S	^w C (m ³ /Pa) =	NA	C (m³/Pa) =	5.0E-11	
10 0	10°	[≇] C _D (-) =	NA	C _D (-) =	5.5E-03	
· · · ·	· · · · ·	ξ(-) =	-1.5	ξ(-) =	-0.9	
	0.3					
10 ° 10 '	10 ⁻² 10 ⁻³ 10 ⁻⁴ 10 ⁻¹	$T_{GRF}(m^2/s) =$		T _{GRF} (m²/s) =		
ch		S _{GRF} (-) =		S _{GRF} (-) =		
		$D_{GRF}(-)$ =		D _{GRF} (-) =		
Log-Log plot incl. derivatives-	recovery period	Selected represe	entative paran	neters.		
		$dt_1 (min) =$	0.07	C (m³/Pa) =	5.0E-11	
		dt_2 (min) =	0.22	C _D (-) =	5.5E-03	
10 ² 10 ⁻¹ 10 ⁻¹ Lupsed Ime	(0)_2	$T_{T} (m^{2}/s) =$	2.5E-07	ξ(-) =	-0.9	
SNB Lakeliar / NCA 04 665.76 - 665.76 / Chir	(c) Golder Associates 10	S (-) =	1.0E-06			
		$K_s (m/s) =$	1.3E-08			
10	10	$S_{s}(1/m) =$	5.0E-08			
	A LAST CONTRACTOR OF A	Comments:				
B 10 °	The recommended transmissivity of 2.5E-7 m2/s was derived from th					
		analysis of the CHir phase, which shows the best data and derivative quality. It should be noted that the results are uncertain due to the uncertainties concerning the flow dimension. The confidence range for the interval transmissivity is estimated to be 7.0E-8 to 5.0E-7 m2/s.				
-						
	10					
		The analysis was co	onducted assumi	ng a flow dimension	n of 2 for the	
$\frac{1}{10^{\circ}} \frac{1}{10^{\circ}} \frac{1}{10^{\circ}} \frac{1}{10^{\circ}} \frac{1}{10^{\circ}} \frac{1}{10^{\circ}} \frac{1}{10^{\circ}} \frac{1}{10^{\circ}} \frac{1}{10^{\circ}}$ inner zone and a flow dimension of 1 for the outer zone. The static					e. The static	
pressure measured at transducer depth, was derived from the CH					om the CHir	
		phase using straigh	t iine extrapolati	on in the Horner pl	ot to a value of	
1007.5.0 KPa.						

	Test Sum	mary Sheet				
Project:	Oskarshamn site investigation	Test type:[1]			Pi	
Area:	Laxema	r Test no:		1		
Borehole ID:	KLX04	1 Test start:	040828 13:37			
Test section from - to (m):	685.79-705.79 n	Responsible for	Jörg Böhne			
Section diameter, 2·r _w (m):	0.070	8 Responsible for		Crist	ian Enachescu	
Linear plot Q and p		Flow period		Recovery period		
		Indata		Indata		
7300	0.010 KLX04_685.79-705.79_040828_1_CHir_Q_r	p ₀ (kPa) =	6889			
7200 -	• 0.009 • P section	p _i (kPa) =	6967			
	▲ P above □ P below - 0.008	$p_{p}(kPa) =$	7182	p _F (kPa) =	7002	
7100 -	0.007	$O_{(m^{3}/s)} =$	0.00E+00			
	0.006 g	$d_p (m/s)^{-}$	1200	t _F (s) =	1200	
1000 - 7000 - 100	- 0.005 Z	Sel S [*] (_)=	1.00E-06	S el S [*] (_)=	1.00E-06	
1900		EC (mS/m)=		5 ei 5 (- <i>)</i> -		
Å •	9 - 0.004 -	Temp(gr C)=	18.1			
6800 ·	+ 0.003	Derivative fact =	-	Derivative fact =	0.26	
6700	- 0.002		-		0.20	
	- 0.001					
6600 • • • • • • • • • • • • • • • • • •	1.50 2.00 2.50 d Time [h]	Results		Results		
		Q/s (m ² /s)=	NA			
Log-Log plot incl. derivates- fl	ow period	T _M (m ² /s)=	NA			
		Flow regime:	transient	Flow regime:	transient	
		dt ₁ (min) =	-	dt₁ (min) =	*	
		dt ₂ (min) =	-	dt ₂ (min) =	*	
		T (m²/s) =	NA	T (m²/s) =	1.8E-10	
		S (-) =	NA	S (-) =	1.0E-06	
		K _s (m/s) =	NA	K _s (m/s) =	9.0E-12	
Not At	nalvsed	$S_{s}(1/m) =$	NA	S _s (1/m) =	5.0E-08	
	2	C (m ³ /Pa) =	NA	C (m ³ /Pa) =	3.4E-11	
		C _D (-) =	NA	C _D (-) =	3.8E-03	
		ξ(-) =	NA	ξ(-) =	5.9	
		$T_{GRF}(m^2/s) =$		$T_{GRF}(m^2/s) =$		
		S _{GRF} (-) =		S _{GRF} (-) =		
		D _{GRF} (-) =		D _{GRF} (-) =		
Log-Log plot incl. derivatives-	recovery period	Selected represe	entative param	neters.		
		dt ₁ (min) =	*	C (m ³ /Pa) =	3.4E-11	
		dt ₂ (min) =	*	C _D (-) =	3.8E-03	
Elapsed time [h]	19, ¹	$T_{T}(m^{2}/s) =$	1.8E-10	ξ(-) =	5.9	
685.79 - 705.79 / Pi	FlowDim Version 2-14b (c) Golder Associates	S (-) =	1.0E-06			
•	0.3	K_{s} (m/s) =	9.0E-12			
	10 -1	S _s (1/m) =	5.0E-08			
10		Comments:				
*: IARF not measured						
· · · ·	10 2	The recommended transmissivity of 1.8E-10 m2/s was derived from the analysis of the Pi phase. Considering the inherent uncertainties related to the memory of the phase of the				
10 1	-					
to the measurement (e.g. specially the measurement of the wellbox storage coefficient) and to the analysis process, the confidence ra					fidence range	
	• •	for the transmissivi	ty is estimated to	be 9E-11 to 6E-10	m2/s It should	
10 ⁶ 10 ⁶ 10	10 ⁷ 10 ⁶ 10 ⁹	be noted that due to	the very low in	terval transmissivity	the results are	
		very uncertain. The	e analysis was co	nducted using a flow	w dimension of	
		2. No static pressur	e could be deriv	eu.		

	Test Su	ımn	nary Sheet				
Project:	Oskarshamn site investiga	ation	Test type:[1]		Chir		
Area:	Laxe	emar	Test no:				
Borehole ID:	KLX04		Test start:	040828 17:59			
Test section from - to (m):	805.98-825.9	98 m	Responsible for test execution:	Jörg Böhner			
Section diameter, 2·r _w (m):	0.	.076	Responsible for test evaluation:		Cristian Enachesc		
Linear plot Q and p			Flow period		Recovery period		
2000			Indata		Indata		
KLX04_805.98-825.98_040828_1_CHir_Q_r	P section	10	p ₀ (kPa) =	8067			
8250 -	P below	09	p _i (kPa) =	-			
8200 -	0.0	08	p _p (kPa) =	-	p _F (kPa) =	-	
8150 -	- 0.0	07	Ω_{r} (m ³ /s)=	-			
§ 8100	0.0	⁰⁶ Ξ	$d_p (m/s)^{-}$	-	t _⊏ (s) =	-	
P. Market Barrier Barr	- 0.0	Rate []/m	+ (-) S al S [*] ()=	1.00E-06	S ol S [*] ()-	1 00E-06	
9 and		njection	Sei S (-)- EC (mS/m)=	1.002 00	3 el 3 (- <i>)</i> -	1.002.00	
§ 8000 ·	+ 0.0	04 =	$EO_w (IIIO/III)^-$	20.0			
7950 -	- 0.0	03	Temp _w (gr C)-	20.0	Dorivativa fact -		
7900 -	- 0.0	02	Derivative Tact.=	-	Derivative fact.=	-	
7850 -	0.0	01					
7800	0.0	00					
0.00 0.20 0.40 Elaps	0.60 0.80 1.00 1.20		Results		Results		
			Q/s (m²/s)=	NA			
Log-Log plot incl. derivates- f	low period		T _M (m²/s)=	NA			
			Flow regime:	transient	Flow regime:	transient	
			dt ₁ (min) =	-	dt ₁ (min) =	-	
			dt ₂ (min) =	-	dt ₂ (min) =	-	
			$T(m^{2}/s) =$	NA	T (m²/s) =	NA	
			S (-) =	NA	S (-) =	NA	
			K _s (m/s) =	NA	K _s (m/s) =	NA	
Not A1	nalvsed		$S_{s}(1/m) =$	NA	$S_{s}(1/m) =$	NA	
			$C (m^{3}/Pa) =$	NA	$C (m^{3}/Pa) =$	NA	
			$C_{D}(-) =$	NA	$C_{\rm D}(-) =$	NA	
			٤ (-) =	NA	ع (-) =	NA	
			() <		()		
			$T_{aaa}(m^2/s) =$		$T_{a=a}(m^2/a) =$	<u> </u>	
			$S_{GRF}(-) =$		$S_{GRF}(-) =$		
					$D_{ODE}(-) =$		
l og-l og plot incl. derivatives	recovery period		Selected represe	ntative naran	eters		
Log-Log plot mon derivatives.			dt. (min) -		$O(m^3/D^{-1})$	NΔ	
			$dt_1(min) =$	-	C (m ² /Pa) =		
			$u_1(1111) =$	- NIA	$C_{D}(-) =$		
			$I_{T}(m^{2}/s) =$		ς(-) =	NΑ	
			S(-) =	NA		ļ	
	1 1		$\kappa_{s}(m/s) =$	NA			
Not Ai	nalysed		S _s (1/m) =	NA			
			Comments:				
			Based on the test re transmissivity is low	sponse (prolong ver than 1E-11 r	ed packer compliand n2/s.	ce) the interval	

Test Summary Sheet							
Project:	Oskarshamn site investigation	Test type:[1]			Pi		
Area:	Laxema	r Test no:					
Borehole ID:	KLX0	1 Test start:	040828 20:06				
Test section from - to (m):	826.02-846.02 n	Responsible for test execution:	Jörg Böhner				
Section diameter, 2·r _w (m):	0.07	8 Responsible for		Cristi	ian Enachescu		
Linear plot Q and p		Flow period		Recovery period			
	240	Indata		Indata			
P section	KLX04_826.02-846.02_040828_1_Pi_Q_r	p ₀ (kPa) =	8261				
▲ P above ■ P below		p _i (kPa) =	8293				
	0.08	p _p (kPa) =	8492	p _F (kPa) =	8415		
8400 -		$Q_{p}(m^{3}/s) =$	-				
[egg]	● ^{0.06} ⊊	tp(s) =	60	t _F (s) =	3600		
8 8300 1	Rate	S el S [*] (-)=	1.00E-06	S el S [*] (-)=	1.00E-06		
withole		$EC_w (mS/m) =$					
8200 -	₹	Temp _w (ar C)=	20.3				
		Derivative fact =	-	Derivative fact =	-		
8100 -	- 0.02						
│							
	0.00	Posults		Posults			
Elapsed	Time [h]		ΝΔ	Results			
Log Log plot incl. derivatos, fla	aw pariod	Q/s (ff /s) =					
Log-Log plot mel. derivates- no	Jw period	I _M (m ⁻ /s)=	INA	Flow regime:	transiant		
		How regime.	transient	riow regime.	liansieni		
		$dt_1(min) =$	-	dt ₁ (min) =	-		
		$ul_2(mn) =$	-	$ul_2(\Pi\Pi\Pi) =$	-		
		I (m ⁻ /s) =		I (m ⁻ /s) =			
		S (-) =	NA	S (-) =	NA		
	1 1	$K_s(m/s) =$	NA	$K_s (m/s) =$	NA		
Not An	alysed	$S_{s}(1/m) =$	NA	$S_{s}(1/m) =$	NA		
		C (m³/Pa) =	NA	C (m³/Pa) =	NA		
		$C_{D}(-) =$	NA	C _D (-) =	NA		
		ξ(-) =	NA	ξ(-) =	NA		
		-					
		$T_{GRF}(m^2/s) =$		T _{GRF} (m²/s) =			
		S _{GRF} (-) =		S _{GRF} (-) =			
		D _{GRF} (-) =		D _{GRF} (-) =			
Log-Log plot incl. derivatives-	recovery period	Selected represe	entative paran	ieters.			
		dt_1 (min) =	-	C (m ³ /Pa) =	NA		
		$dt_2 (min) =$	NA	C _D (-) =	NA		
		$T_{T} (m^{2}/s) =$	NA	ξ(-) =	NA		
		S (-) =	NA				
		$K_s (m/s) =$	NA				
Not An	alysed	S _s (1/m) =	NA				
		Comments:					
	Based on the test re transmissivity is low No further analysis	sponse (prolong wer than 1E-11 r recommended.	ed packer compliand n2/s.	ce) the interval			

	Test Summary Sheet							
Project:	Oskarshamn site inves	tigation	Test type:[1]		Chir			
Area:	Li	axemar	Test no:	1				
Borehole ID:	KLX04		Test start:	040828 22:55				
Test section from - to (m):	846.05-86	6.05 m	Responsible for test execution:	Jörg Böhner				
Section diameter, $2 \cdot r_w$ (m):		0.076	Responsible for test evaluation:		Cristian Enachescu			
Linear plot Q and p			Flow period		Recovery period	4		
8500		0.010	Indata		Indata			
KLX04_846.05-866.05_040828_1_CHir_Q_r		p ₀ (kPa) =	8457					
8550 -		+ 0.009	p _i (kPa) =	-				
8500		- 0.008	p _p (kPa) =	-	p _F (kPa) =	-		
		- 0.007	Ω_{r} (m ³ /s)=	-	,			
ह ⁸⁴⁵⁰	ľ	- ^{0.006} ਵ	tp(s) =	-	t₌ (s) =	-		
9_116 8400 -	P section	- 0.005 문	$S = S^{*}() -$	1.00E-06		1.00E-06		
A domentia a domentia a domentia a domentia a domentia a domentia a domentia a domentia a domentia a domentia a	P above P below	jection	$S \in S(-) =$ EC (mS/m)=	1.002.00	3 8 3 (-)-	1.001 00		
â ₈₃₅₀ .	<u>`</u> q	- 0.004 =	LO_{W} (mo/m)=	20.7				
8300 -		- 0.003	Temp _w (gr C)-	20.7	Derivative fact -			
		- 0.002	Derivative Tact.=	-	Derivative fact.=	-		
8250 -		- 0.001						
8200		0.000						
0.00 0.20 0.40 0 Elapse	0.60 0.80 1.00 d Time [h]	1.20	Results		Results			
			Q/s (m²/s)=	NA				
Log-Log plot incl. derivates- fl	ow period		T _M (m²/s)=	NA				
			Flow regime:	transient	Flow regime:	transient		
			dt ₁ (min) =	-	dt ₁ (min) =	-		
			dt ₂ (min) =	-	dt ₂ (min) =	-		
			T (m²/s) =	NA	$T(m^{2}/s) =$	NA		
			S (-) =	NA	S (-) =	NA		
			$K_s (m/s) =$	NA	$K_s (m/s) =$	NA		
Not Ar	nalvsed		S _s (1/m) =	NA	S _s (1/m) =	NA		
			$C (m^{3}/Pa) =$	NA	$C (m^{3}/Pa) =$	NA		
			$C_{D}(-) =$	NA	$C_{D}(-) =$	NA		
			۶ (-) =	NA	۶ (-) =	NA		
			· ()		· / / د			
			$T_{(m^{2}/c)} =$		$T_{(m^{2}/n)} =$			
			$S_{ORF}(1175) =$		$S_{ORF}(-) =$	╉────┥		
			$D_{\text{GRF}}(r) =$		$D_{\text{GRF}}(r) =$	ł		
l og l og plot incl. derivatives	recovery period		Selected represe	ntativo paran	PGRF ()			
	recovery period		dt. (min) -		$C(m^3/D^{-1})$	ΝΔ		
			$dt_1(min) =$	-	C (m ⁷ /Pa) =			
			$dl_2 (mn) =$	-	C _D (-) =	NA NA		
			T _⊤ (m²/s) =	NA	ξ(-) =	NA		
			S(-) =	NA NA				
.	1 1		κ_{s} (m/s) =	NA		<u> </u>		
Not Ar	nalysed		S _s (1/m) =	NA				
			Based on the test re transmissivity is lov No further analysis	sponse (prolong ver than 1E-11 r recommended.	ed packer complian n2/s.	ce) the interval		








Test Summary Sheet						
Project:	Oskarshamn site investigat	tion <mark>1</mark>	est type:[1]			Chir
Area:	Laxen	mar T	est no:			1
Borehole ID:	KLX	X04 T	est start:	040831 10:30		040831 10:30
Test section from - to (m):	943.05-963.05 m		Responsible for est execution:			Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.0	076 F	Responsible for		Cristi	an Enachescu
Linear plot Q and p		F	low period	<u> </u>	Recovery period	
p		il I	ndata		Indata	
9650	KLX04_943.05-963.05_040831_1_CHir_Q_r	р	₀ (kPa) =	9399		
9600 ·	- 0.45	p	(kPa) =	9401		
9550 P above	• 0.40	p	_p (kPa) =	9603	p _F (kPa) =	9400
9500	0.35	G	$D_{\rm p} ({\rm m}^3/{\rm s}) =$	2.62E-06		
	0.30	≣ tr	$r_{\rm s}({\rm s}) =$	1200	t _F (s) =	1200
	0.25	Rate I/r	Sel S [*] (-)=	1.00E-06	S el S [*] (-)=	1.00E-06
9400	0.20	Injection	C _w (mS/m)=			
9350 ·		Т	emp _w (gr C)=	22.2		
9300 -	- 0.15	C	Derivative fact.=	0.02	Derivative fact.=	0.10
	- 0.10	-				
9250 -	- 0.05	-				
9200 0.20 0.40 0.60 0.80	0.00 1.00 1.20 1.40 1.60 1.80	R	Results		Results	
Elapse	d Time [h]	G	$0/s (m^2/s) =$	1.3E-07		
Log-Log plot incl. derivates- fl	ow period	T	$(m^2/s) =$	1.3E-07		
	-	F	low regime:	transient	Flow regime:	transient
		d	t_1 (min) =	0.19	dt_1 (min) =	1.16
10 ² 5KB Laysemar (KLX 04 5KB Laysemar (KLX 04	-2	d	t_2 (min) =	2.07	dt_2 (min) =	3.60
943.05 - 963.05 / CN	(c) Golder Associates	T	$(m^2/s) =$	1.6E-07	$T(m^{2}/s) =$	2.7E-07
1	30	S	S (-) =	1.0E-06	S (-) =	1.0E-06
10 1	1 0 ⁻¹	ĸ	$K_s (m/s) =$	8.1E-09	$K_s (m/s) =$	1.3E-08
		S	$S_{s}(1/m) =$	5.0E-08	$S_{s}(1/m) =$	5.0E-08
• • • •	* 3 \$ \$		C (m ³ /Pa) =	NA	C (m ³ /Pa) =	9.0E-11
× .	10 °	。 ^{at} C	C _D (-) =	NA	C _D (-) =	9.9E-03
10	A Andrew Marine Marine and Andrew	ξ	(-) =	1.1	ξ(-) =	5.2
	0.3					
	10 -1	. T	$G_{\text{GRF}}(\text{m}^2/\text{s}) =$		$T_{GRF}(m^2/s) =$	
- 10 ^{-2'} 10 ^{-4'} 10	10 ⁵ 10 ⁶ 10 ⁷	S	$G_{GRF}(-) =$		$S_{GRF}(-) =$	
		D	O _{GRF} (-) =		D _{GRF} (-) =	
Log-Log plot incl. derivatives-	recovery period	S	elected represe	ntative param	leters.	
		d	t ₁ (min) =	1.16	C (m³/Pa) =	9.0E-11
Elapsed time 1	[h]	d	t ₂ (min) =	3.60	C _D (-) =	9.9E-03
SKB Laxemar / KLX 04 943.05 - 963.05 / Chir	FlowDim Version 2.14b (c) Golder Associates	°' T	$T_{\rm T} (m^2/s) =$	2.7E-07	ξ(-) =	5.2
		S	6 (-) =	1.0E-06		
10 ¹	10	。2 K	K _s (m/s) =	1.3E-08		
:		S	S _s (1/m) =	5.0E-08		
2 10 ° °	Construction of the second second second second second second second second second second second second second	Re C	comments:	-		
10 ⁻⁴	10 ⁻¹ 10 ⁻¹ 10 ⁻¹	ໍ່ຈຼີ T a: • ຊ ຢ w	The recommended the nalysis of the CHin uality. The confide stimated to be 9.01 uring the test is 2. yas derived from the test is 2.	transmissivity of phase, which sl ence range for th E-8 to 4.0E-7 m ² The static pressue CHir phase us	2.7E-7 m2/s was de nows the best data ar e interval transmissi 2/s. The flow dimens are measured at trans- ting straight line extr	rived from the id derivative vity is sion displayed sducer depth, rapolation in the
		Н	Iorner plot to a val	ue of 9395.9 kP	a.	





Test Summary Sheet						
Project:	Oskarshamn site investigation	Test type:[1]			Chir	
Area:	Laxemar	Test no:	1			
Borehole ID:	KLX04	Test start:			040901 13:06	
Test section from - to (m):	305.41-310.41 m	Responsible for test execution:			Jörg Böhner	
Section diameter, 2·r _w (m):	0.076	Responsible for		Crist	ian Enachescu	
Linear plot Q and p		Flow period		Recovery period		
		Indata		Indata		
3200	0.50	p₀ (kPa) =	3017			
KLX04_305.41-310.41_040901_1_CHir_Q_r	• P section	p _i (kPa) =	-			
	P above 0.40 P below	p _p (kPa) =	-	p _F (kPa) =	-	
3100 -	• • 0.35	Ω_{r} (m ³ /s)=	-			
[64]	0.30 =	$d_p (m/3)^{-}$	-	t⊧ (s) =	-	
		S ol S [*] ()=	-	S d S [*] ()-	_	
Participation Pa	liet ton	$S = (3 (-)^{-})^{-}$		3 el 3 (- <i>)</i> -		
3000		$EO_{W}(IIIO/III)^{-}$	11.3			
	0.15	Derivative fact -	11.3	Dorivativa fact -		
2950	······································	Derivative Tact	-	Derivative fact	-	
	- 0.05					
2900	0.00					
0.00 0.10 0.20 0.30 0.40	0.50 0.60 0.70 0.80 0.90 1.00 ed Time [h]	Results		Results	-	
		Q/s (m²/s)=	NA			
Log-Log plot incl. derivates- fl	ow period	T _M (m ² /s)=	NA			
		Flow regime:	transient	Flow regime:	transient	
		dt ₁ (min) =	-	dt ₁ (min) =	-	
		dt ₂ (min) =	-	dt ₂ (min) =	-	
		T (m²/s) =	NA	$T(m^{2}/s) =$	NA	
		S (-) =	NA	S (-) =	NA	
		$K_s (m/s) =$	NA	$K_s (m/s) =$	NA	
Not At	nalvsed	$S_{s}(1/m) =$	NA	$S_{s}(1/m) =$	NA	
		$C_{\rm (m^3/Pa)} =$	NA	$C (m^{3}/Pa) =$	NA	
		$\frac{C_{D}(-)}{C_{D}(-)} =$	NA	$C_{D}(-) =$	NA	
		ج (-) =	NA	۶ (-) =	NA	
		· /) د		()		
		$T_{(m^{2}/c)} =$		$T_{(m^{2}/c)} =$		
		$S_{CPE}(-) =$		$S_{GRF}(1175) =$		
		$D_{ODE}(-) =$		$D_{ODE}(-) =$		
l og l og plot incl. derivatives	recovery period	Selected represe	ntative paran	neters		
	receivery believe	dt_{4} (min) =	NA	$C (m^3/D_{-})$	NA	
		dt_{a} (min) =	NΔ	C (m /Pa) =	NΔ	
		= (2)		$C_D(-) =$		
	I _T (m ⁻ /s) =		ς(-) =	INA I		
		S (-) =	NA			
	$K_s(m/s) =$	NA				
Not Ai	nalysed	$S_{s}(1/m) =$	NA			
		Comments:				
		Based on the test re transmissivity is low	sponse (prolong ver than 1E-11 r	ed packer complian n2/s.	ce) the interval	

	Test S	umn	narv Sheet			
Project:	Oskarshamn site investig	gation	Test type:[1]			Chir
Area:	Lax	emar	Test no:			1
Borehole ID:	к	LX04	Test start:			040901 14:43
Test section from - to (m):	310.42-315.	.42 m	Responsible for test execution:			Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	(0.076	Responsible for		Crist	an Enachescu
Linear plot Q and p			Flow period	<u>.</u>	Recovery period	
			Indata		Indata	
3300 KLX04_310.42-315.42_040901_1_CHir_Q_r	••••••••	1.0	p₀ (kPa) =	3066		I
3250 •	•	- 0.9	p; (kPa) =	3065		
		- 0.8	$p_{\rm p}(\rm kPa) =$	3285	p _∈ (kPa) =	3064
P section		- 0.7	$\bigcap_{n=1}^{\infty} (m^3/s) = 1$	5.00E-06	P1 ()	
		- ^{0.6} ਵ	$d_p (m/3)^{-}$	1200	t _F (s) =	1200
0 3 150 ·		Bate []/u	S el S [*] (-)=	1.00E-06	S el S [*] (_)=	1.00E-06
3100		Injection	EC., (mS/m)=		0 ei 0 (-)-	
8	La	0.4	Temp _w (ar C)=	11.5		
3050 -		- 0.3	Derivative fact.=	0.13	Derivative fact.=	0.02
3000		- 0.2				
2950		0.0	-			
0.00 0.20 0.40 Elap	0.60 0.80 1.00 1. sed Time [h]	.20	Results		Results	
			$Q/s (m^2/s) =$	2.2E-07		
Log-Log plot incl. derivates- f	low period		$T_M (m^2/s) =$	1.8E-07		
			Flow regime:	transient	Flow regime:	transient
Elapsed time	[^[h]		dt_1 (min) =	1.01	dt_1 (min) =	0.41
10 2 SKB Laxemar / KLX 04 310.42 - 315.42 / Chi	FlowDim Version 2.14b (c) Golder Associates		dt_2 (min) =	2.50	dt_2 (min) =	7.33
		10	$T(m^{2}/s) =$	4.6E-07	$T(m^{2}/s) =$	1.0E-06
10 1 e e6 a v darwater darwater darwater darwater darwater darwater darwater darwater darwater darwater darwater		-	S (-) =	1.0E-06	S (-) =	1.0E-06
		10 °	$K_s (m/s) =$	9.2E-08	K _s (m/s) =	6.7E-08
۰ ۵۰		- F	$S_{s}(1/m) =$	2.0E-07	$S_s(1/m) =$	2.0E-07
	A CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF CONTRACT OF C	10, (1/d) (mir	C (m³/Pa) =	NA	C (m³/Pa) =	4.8E-11
		14	$C_D(-) =$	NA	C _D (-) =	5.3E-03
10 -1		10 -2	ξ(-) =	5.5	ξ(-) =	21.0
			$T_{(m^{2}/2)} =$		$T_{(m^{2}/c)} =$	
10 ^{.0} 10 ^{.0}	10 ⁻¹⁰ 10 ⁻¹¹ 10 ⁻¹²	2	$S_{GRF}(-) =$		$S_{GRF}(-) =$	
			$D_{CRF}(-) =$		$D_{CRE}(-) =$	
Log-Log plot incl. derivatives	- recovery period		Selected represe	entative param	neters.	
			dt₁ (min) =	1.01	C (m ³ /Pa) =	4.8E-11
10, ⁻⁴ Elapsed time (*	ı) 10, ⁻² 10, ⁻¹ 10, ⁰		dt_2 (min) =	2.50	$C_{D}(-) =$	5.3E-03
10 2 SKB Laxemar / KLX 04 310.42 - 315.42 / CHir	FlowDim Version 2.14b (c) Golder Associates		$T_{T}(m^2/s) =$	4.6E-07	٤ (-) =	5.5
		300	S (-) =	1.0E-06	5 ()	
			$K_s(m/s) =$	9.2E-08		
10		10 2	$\frac{S_{s}(1/m)}{S_{s}(1/m)} =$	2.0E-07		
		30 æ	Comments:			
	· · · · ·	0.00-0010	The recommended t analysis of the CHi quality. The confide estimated to be 1.0I during the test is 2. was derived from th	transmissivity of phase, which sh ence range for th E-7 to 8.0E-7 m ² The static press the CHir phase us	4.6E-7 m2/s was de ows the best data an e interval transmiss: 2/s. The flow dimens ure measured at tran ing straight line exti	rived from the d derivative ivity is sion displayed sducer depth, rapolation in the
10 [°] 10 [°] 10 [°]	10 10 [°] 10 [°]		Horner plot to a val	ue of 3063.3 kP	a.	apointion in the



	Test Summ	nary Sheet			
Project: Oskarsha	amn site investigation	Test type:[1]			Chir
Area:	Laxemar	Test no:			1
Borehole ID:	KLX04	Test start:			040901 18:55
Test section from - to (m):	320.43-325.43 m	Responsible for test execution:			Jörg Böhner
Section diameter, 2·r _w (m):	0.076	Responsible for		Cristi	an Enachescu
Linear plot Q and p		Flow period		Recovery period	
		Indata	Indata		
S400 KLX04_320.43-325.43_040901_1_CHir_Q_r	0.04	p ₀ (kPa) =	3162		
3350 -	-	p _i (kPa) =	3161		
3300 -	P section 0.03	p _p (kPa) =	3363	p _F (kPa) =	3161
	P above P below	$Q_{p} (m^{3}/s) =$	2.72E-07		
	8 G	tp (s) =	1200	t _F (s) =	1200
2200 	0.02	S el S [*] (-)=	1.00E-06	S el S [*] (-)=	1.00E-06
	Injectio	EC _w (mS/m)=			
3160		Temp _w (gr C)=	11.7		
3100	- 0.01	Derivative fact.=	0.03	Derivative fact.=	0.02
	0.00	Results		Results	
Elapsed Time (h)		$\Omega/s (m^2/s) =$	1.3E-08		
Log-Log plot incl. derivates- flow period		$T_{\rm M}$ (m ² /s)=	1.1E-08		
		Flow regime:	transient	Flow regime:	transient
Flansed time (h)		dt₁ (min) =	0.16	dt₁ (min) =	2.57
10 ⁻² 10 ⁻² 10 ⁻² 10 ⁻¹ 10 ⁰		dt_2 (min) =	1.05	dt_2 (min) =	5.33
320.43 - 325.43 / Chi	(c) Golder Associates	$T(m^2/s) =$	1.4E-08	$T(m^{2}/s) =$	1.0E-07
	300	S (-) =	1.0E-06	S (-) =	1.0E-06
10 1	10 2	$K_s(m/s) =$	2.8E-09	$K_s (m/s) =$	2.0E-08
		$S_{s}(1/m) =$	2.0E-07	S _s (1/m) =	2.0E-07
	30 [[uuuu] .tr	C (m ³ /Pa) =	NA	C (m ³ /Pa) =	1.5E-11
10°	10 ¹	$C_{D}(-) =$	NA	$C_{\rm D}(-) =$	1.7E-03
		ξ(-) =	0.0	ξ(-) =	33.1
	3				
10 ² 10 ² 10 ⁴	10 ° 10 °	T _{GRF} (m ² /s) =		T _{GRF} (m²/s) =	
iD		S _{GRF} (-) =		S _{GRF} (-) =	
		D _{GRF} (-) =		D _{GRF} (-) =	
Log-Log plot incl. derivatives- recovery p	eriod	Selected represe	entative paran	neters.	
		$dt_1 (min) =$	0.16	C (m³/Pa) =	1.5E-11
Elapad time (h)	· · · · · · · · · · · · · · · · · · ·	$dt_2 (min) =$	1.05	C _D (-) =	1.7E-03
SKB Laxemar / KLX 04 320 43 - 325 43 / Chir	FlowDim Version 2.14b (c) Golder Associates 300	$T_{T}(m^{2}/s) =$	1.4E-08	ξ(-) =	0.0
· · · · ·	-	S (-) =	1.0E-06		
	10 *	$K_s (m/s) =$	2.8E-09		
	30	S _s (1/m) =	2.0E-07		
	10 ⁴ 10 ²	The recomments: The recommended analysis of the CHi transmissivity is est was conducted usin measured at transdu straight line extrapo	transmissivity of phase. The conf imated to be 6.0 g a flow dimens icer depth, was o plation in the Ho	f 1.4E-8 m2/s was de idence range for the E-9 to 4.0E-8 m2/s. ion of 2. The static p derived from the CH rner plot to a value o	rived from the interval The analysis ressure ir phase using of 3161.4 kPa.

	Test Sum	mary Sheet			
Project:	Oskarshamn site investigatio	n <u>Test type:[1]</u>			Chir
Area:	Laxema	ar Test no:			1
Borehole ID:	KLX0	4 Test start:	040901 23:17		
Test section from - to (m):	325.44-330.44 r	n Responsible for test execution:		Jörg Böhner	
Section diameter, 2·r _w (m):	0.07	6 Responsible for		Crist	ian Enachescu
Linear plot Q and p		Flow period		Recovery period	
		Indata		Indata	
3500 KLX04_325.44-330.44_040901_1_CHir_Q_	0.10	p ₀ (kPa) =	3213		
3450 -		p _i (kPa) =	3211		1 1
3400		$p_{p}(kPa) =$	3418	p _F (kPa) =	3210
		Ω_{r} (m ³ /s)=	1.10E-06		
= 3350 · ● P section • • • • • • • • • • • • • • • • • • •	0.06 <u>e</u>	$d_p (m/3)^{-}$	1200	t _F (s) =	300
	Rate Il/m	S el S [*] (-)=	1.00E-06	Sel S [*] (-)=	1.00E-06
	- 0.04	$EC_w (mS/m) =$			
a 3250		Temp _w (gr C)=	11.8		
3200	╢┝╼╢┝╍╂╍┥ ┍╴	Derivative fact.=	0.09	Derivative fact.=	0.02
3150					
		Rosults		Rosults	
Elapse	d Time [h]	$\Omega/s (m^2/s) =$	5.2E-08	lioouno	
l og-l og plot incl. derivates- fl	ow period	$T_{m}^{2}(c) = T_{m}^{2}(c)$	4.3E-08		
		Flow regime:	transient	Flow regime:	transient
		dt_1 (min) =	0.48	dt_1 (min) =	0.67
Elapsed time [h	η 1ρ, ⁻¹ 1ρ, ⁰ 1ρ, ⁰	dt_2 (min) =	4 25	dt_2 (min) =	2.12
SKB Laxemar / KLX 04 325.44 - 330.44 / Chi	FlowDim Version 2.14b (c) Golder Associates	$T_{m}(m^{2}/s) =$	2.4E-07	$T_{m}(m^{2}/s) =$	2.3E-07
10		S(-) =	1.0F-06	S (-) =	1.0E-06
	- 10 ¹	$K_{c}(m/s) =$	4.7E-08	$K_{c}(m/s) =$	4 5E-08
10 *	:	$S_{s}(1/m) =$	2.0E-07	$S_{s}(1/m) =$	2.0E-07
0° (Heldi	10 ⁰	$C (m^3/Pa) =$	NA	$C_{(m^{3}/Pa)} =$	1.5E-11
52 to 1		$\frac{1}{2} C_{D}(-) =$	NA	$C_{D}(-) =$	1.6E-03
	10 ⁻¹	ε (-) =	0.0	ε (-) =	21.6
10 -2		5()		()	
	10 2	$T_{opc}(m^2/s) =$		$T_{ops}(m^2/s) =$	
10 ^{2'} 10 ^{3'} tD	10 ⁻⁴ 10 ⁻⁵	$S_{GRF}(-) =$		$S_{GRF}(-) =$	
		$D_{GRE}(-) =$		$D_{GRE}(-) =$	
Log-Log plot incl. derivatives-	recovery period	Selected represe	entative paran	neters.	
		dt_1 (min) =	0.67	C (m ³ /Pa) =	1.5E-11
Elapsed time (h)	: 10 ⁻¹ ••• ⁰	dt_2 (min) =	2.12	C _D (-) =	1.6E-03
10 2 SKB Laxemar / KLX 04	FlowDim Version 2.14b	T⊤ (m²/s) =	2.3E-07	ξ(-) =	21.6
325.44 - 330.44 / Chir	(c) Golder Associates	S (-) =	1.0E-06	• • •	
		$K_s (m/s) =$	4.5E-08		
10 1	10 ²	$S_{s}(1/m) =$	2.0E-07		
	30	Comments:			
d		The recommended	transmissivity of	f 2.3E-7 m2/s was de	erived from the
10 *	10	analysis of the CHin	r phase, which s	hows the best data a	nd derivative
		quality. The confide	ence range for th	e interval transmiss	ivity is
· ·	3	estimated to be 8.01 during the test is 2	E-8 to 5.0E-7 m The static press	2/s. The flow dimensured at tran	sion displayed
10 ¹ 10 ² 10 ²	10 ³ 10 ⁴ 10 ⁵	was derived from the Horner plot to a val	ne CHir phase us ue of 3210.4 kP	sing straight line ext	rapolation in the



Test Summary Sheet						
Project:	Oskarshamn site investigation	Test type:[1]			Chir	
Area:	Laxemar	Test no:			1	
Borehole ID:	KLX04	Test start:			040902 07:47	
Test section from - to (m):	335.44-340.44 m	Responsible for test execution:			Jörg Böhner	
Section diameter, 2·r _w (m):	0.076	Responsible for		Cristi	an Enachescu	
Linear plot Q and p		Flow period		Recovery period		
3550	- 0.50	Indata		Indata		
KLX04_335.44-340.44_040902_1_CHir_Q_r		p ₀ (kPa) =	3312			
3500 •	0.45	p _i (kPa) =	3310			
	+ 0.40	p _p (kPa) =	3512	p _F (kPa) =	3309	
3450 · ● P section ▲ P above	- 0.35	Q _p (m ³ /s)=	2.25E-06			
€ 3400 ·	● ^{0.30} Ē	tp (s) =	1200	t _F (s) =	300	
lo Pres su	- 0.25 2 5	S el S [*] (-)=	1.00E-06	S el S [*] (-)=	1.00E-06	
المعند (1997) و	t 0.20 ^t 0.20 ^t	EC _w (mS/m)=				
3300		Temp _w (gr C)=	11.9			
	0.10	Derivative fact.=	0.02	Derivative fact.=	-	
3250	0.05					
3200		Booulto		Poculto		
0.00 0.20 0.40 Etapsed T	0.80 0.80 1.00		1 1 - 07	Results		
Log Log plot incl. derivates flo	w poriod	Q/s (m/s) =				
Log-Log plot men derivates- no	wpenou	I _M (m ⁻ /s)=	9.0E-00	Flow regime:	transiont	
		dt. (min) =		dt. (min) –	transient	
Elapsed time [h]	10 ⁻¹ 10 ⁰ FlowDim Version 2.14b	$dt_1(min) =$	0.52	$dt_1(min) =$	-	
SKB Laxema / KLX 04 335.44 - 340.44 / Chi	(c) Golder Associates 10	$dt_2(1111) =$	8.5E_08	$d_{12}(mn) =$	- NA	
6 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	•	I (m /s) =	1 0E 06	I (m /s) =		
	· · ·	S(-) = K(m/s) = -	1.00-00	S(-) = K(m/c) = -		
· · · · · · · · · · · · · · · · · · ·	10 °	$N_{s}(11/3) =$	2.0E-07	$N_{s}(11/3) =$		
10941) °C	Finite	$O_{s}(1/11) = O_{s}(1/11)$		$O_{s}(1/11) = O_{s}(1/11)$		
	0.3 (b) () () ()	$C(m/Pa) = C_{r}(r) = 0$	ΝΔ	$C(m/Pa) = C_{r}(r) = 0$		
10 -1	• 10 ⁻¹	C _D (-) -	_1 1	C _D (-) -		
		ς(-) -	-1.1	ς (-) –		
	0.03	$T_{opr}(m^2/s) =$		$T_{opc}(m^2/s) =$		
10 ¹ 10 ² tD	10 ³ 10 ⁴ 10 ⁵	$S_{GRF}(-) =$		$S_{GRF}(-) =$		
		$D_{GRF}(-) =$		$D_{GRF}(-) =$		
Log-Log plot incl. derivatives- r	ecovery period	Selected represe	ntative param	neters.		
		dt ₁ (min) =	0.52	C (m ³ /Pa) =	NA	
		dt ₂ (min) =	8.50	$C_{D}(-) =$	NA	
		T⊤ (m²/s) =	8.5E-08	ξ(-) =	-1.1	
		S (-) =	1.0E-06			
		K _s (m/s) =	1.7E-08			
Not Ana	alvsed	S _s (1/m) =	2.0E-07			
	5	Comments:				
		The recommended t analysis of the CHi transmissivity is est dimension displayed the end of the recov recovery, such that	ransmissivity of phase. The conf imated to be 5.0 d during the test ery is 3309.9 kI this phase is not	² 8.5E-8 m2/s was de idence range for the E-8 to 3.0E-7 m2/s. is 2. Static pressure Pa. The CHir phase s analysable.	rived from the interval The flow measured at shows very fast	

	Test Sumr	narv Sheet			
Project:	Oskarshamn site investigation	Test type:[1]			Chir
Area:	Laxemar	Test no:			1
Borehole ID:	KLX04	Test start:			040902 09:24
Test section from - to (m):	340.44-345.44 m	Responsible for test execution:			Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:		Crist	ian Enachescu
Linear plot Q and p	L	Flow period		Recovery period	
· · ·		Indata		Indata	
3600 KLX04 340.44-345.44 040902 1 CHir Q r	0.10	p_0 (kPa) =	3361		
3550		p; (kPa) =	3359		
	- 0.08	$p_r(kPa) =$	3557	p _⊏ (kPa) =	3359
3500 P section	-	$\rho_{\rm p}({\rm Kr}{\rm d})$	6 17E-07		5557
Pabove Pabove Pelow Pelow	• • • • • • • • •	$Q_p (m/s) =$	0.17E-07	t (c) -	200
¥_3450U ≣ ≋	te Billion →	(p(s)) =	1.00E.06	$l_{F}(\mathbf{S}) =$	1.00E.06
80 90 91	etto	SelS (-)=	1.00E-06	S el S (-)=	1.00E-06
00 	0.04 2	EC _w (mS/m)=	10		
3350	-₩ ┡━┓ᢏ	Temp _w (gr C)=	12		
3300	0.02	Derivative fact.=	0.08	Derivative fact.=	0.04
3250	0.00	Descrifte		D	
0.00 0.20 0.40 Elapse	2.60 0.80 1.00 1.20 ≥d Time [ħ]	Results		Results	
	<u> </u>	Q/s (m²/s)=	3.1E-08		
Log-Log plot incl. derivates- fl	ow period	T _M (m ² /s)=	2.5E-08		
		Flow regime:	transient	Flow regime:	transient
Elapsed time	[n]	$dt_1 (min) =$	0.40	dt ₁ (min) =	1.21
10 SKB Laxemar / KLX 04 340.44 - 345.44 / Chi	FlowDm Version 2:14b (c) Golder Associates	$dt_2 (min) =$	6.90	dt_2 (min) =	3.37
	to ²	$T(m^{2}/s) =$	3.2E-08	T (m ² /s) =	1.9E-07
10 1		S (-) =	1.0E-06	S (-) =	1.0E-06
• • • • • • • • • • • • • • • • • • • •		$K_s (m/s) =$	6.4E-09	$K_s (m/s) =$	3.9E-08
	10 ¹	S _s (1/m) =	2.0E-07	S _s (1/m) =	2.0E-07
	loud b	C (m³/Pa) =	NA	C (m³/Pa) =	1.5E-11
	10°	C _D (-) =	NA	C _D (-) =	1.6E-03
10 -1	· ·	ξ(-) =	1.3	ξ(-) =	33.1
	10	$T_{GRF}(m^2/s) =$		$T_{GRF}(m^2/s) =$	
10 ³ 10 ⁴ 10	10 ⁵ 10 ⁶ 10 ⁷	S _{GRF} (-) =		S _{GRF} (-) =	
		D _{GRF} (-) =		D _{GRF} (-) =	
Log-Log plot incl. derivatives-	recovery period	Selected represe	entative paran	neters.	
		dt ₁ (min) =	0.40	C (m ³ /Pa) =	1.5E-11
10, ⁻⁵ 10, ⁻⁴ Elapsed time [n	J 10. ² 10. ¹	dt_2 (min) =	6.90	$C_{D}(-) =$	1.6E-03
10 ² SKB Laxemar / KLX 04 340.44 - 345.44 / Chir	FlowDim Version 2.14b (c) Golder Associates	$T_{T}(m^{2}/s) =$	3.2E-08	ξ(-) =	1.3
	500	S (-) =	1.0E-06	5.(7	
		K _s (m/s) =	6.4E-09		
10	<u>`</u> .	$S_{s}(1/m) =$	2.0F-07		
		Comments:			<u> </u>
a .		The recommended t analysis of the CHi quality. The confide estimated to be 1.01 during the test is 2.	transmissivity of phase, which sh ence range for th E-8 to 6.0E-8 m ² . The static press	f 3.2E-8 m2/s was do ows the best data an ne interval transmiss 2/s. The flow dimens ure measured at tran	erived from the d derivative ivity is sion displayed sducer depth,
10 ^{°°} 10 [°] 10 [°]	10 ⁻² 10 ⁻³ 10 ⁻⁴	was derived from the Horner plot to a val	ue of 3360.4 kP	sing straight line exti a.	rapolation in the

Test Summary Sheet					
Project:	Oskarshamn site investigatio	n <u>Test type:[1]</u>			Chir
Area:	Laxema	ar Test no:			1
Borehole ID:	KLX0	4 Test start:			040902 11:09
Test section from - to (m):	345.44-350.44 r	n Responsible for test execution:	Jörg Böhner		
Section diameter, 2·r _w (m):	0.07	6 Responsible for		Cristi	an Enachescu
Linear plot Q and p		Flow period	<u> </u>	Recovery period	
		Indata		Indata	
KLX04_345.44-350.44_040902_1_CHir_Q_r	0.70	p ₀ (kPa) =	3410		
3600 -	0.65	p _i (kPa) =	3408		
1	P section Pabove 0.60	p _p (kPa) =	3607	p _F (kPa) =	3408
3550 -	P below 0.50	Q _p (m ³ /s)=	2.97E-06		
ह ₃₅₀₀ .	● ^{0.45} ਵ	tp (s) =	1200	t _F (s) =	1200
a Pressur	- 0.40 5 87 - 0.35 5	S el S [*] (-)=	1.00E-06	S el S [*] (-)=	1.00E-06
2 3450 1	0.30 2	EC _w (mS/m)=			
	0.25	Temp _w (gr C)=	12.1		
3400 -	0.20	Derivative fact.=	0.09	Derivative fact.=	-
3350	0.10				
3300	0.05				
0.00 0.20 0.40 0.60 Elapse	0.80 1.00 1.20 1.40 vd Time [h]	Results		Results	
l l		Q/s (m ² /s)=	1.5E-07		
Log-Log plot incl. derivates- fi	ow period	I _M (m²/s)=	1.2E-07	F law, and a s ing a .	tur u ci c u t
		Flow regime:		Flow regime:	transient
Elapsed time (h)	10 . ⁻¹	$dl_1(min) =$	1.27	$dl_1 (min) =$	-
10 SKB Laxemar / KLX 04 345.44 - 350.44 / Chi	FlowDim Version 2.14b (c) Golder Associates	$dt_2(min) =$	17.03	$at_2 (min) =$	-
• • • • • • • • • • • • • • • • • • •		T (m²/s) =	1.1E-07	T (m²/s) =	NA
		S (-) =	1.0E-06	S (-) =	NA
10 °	10 °	$K_s (m/s) =$	2.2E-08	$K_s (m/s) =$	NA
	Marken	$S_{s}(1/m) =$	2.0E-07	$S_{s}(1/m) =$	NA
		C (m [°] /Pa) =		C (m°/Pa) =	
10 -1	10 -1	$C_D(-) =$	NA 1 E	$C_{\rm D}(-) =$	
	0.03	ξ(-) =	-1.5	ξ(-) =	NA
		$T_{m}(m^{2}/n) =$		$T_{(m^{2}/c)} =$	┟────┤
10 ¹ 10 ²	10 ⁻³ 10 ⁻⁴ 10 ⁻⁵	$S_{GRF}(-) =$		$S_{GRF}(-) =$	
		$D_{GRF}(-) =$		$D_{CRF}(-) =$	
Log-Log plot incl. derivatives-	recovery period	Selected represe	entative param	ieters.	
	* • • • • •	dt_1 (min) =	7.27	$C (m^3/Pa) =$	NA
		dt_2 (min) =	17.03	$C_{D}(-) =$	NA
		$T_{-}(m^{2}/s) =$	1.1E-07	ε ₍₋₎ =	-1.5
	S (-) =	1.0E-06	5()		
		$K_{s}(m/s) =$	2.2E-08		
Not Ar	nalvsed	$S_{s}(1/m) =$	2.0E-07		
	lurysed	Comments:			
		The recommended analysis of the CHi transmissivity is est dimension displaye at the end of the rec	transmissivity of phase. The conf imated to be 7.0 d during the test covery is 3408.1	1.1E-7 m2/s was de idence range for the E-8 to 4.0E-7 m2/s. is 2. The static press kPa.	rived from the interval The flow sure measured

	Test Sumr	nary Sheet			
Project:	Oskarshamn site investigation	Test type:[1]			Chir
Area:	Laxemar	Test no:			1
Borehole ID:	KLX04	Test start:			040902 13:20
Test section from - to (m):	350.45-355.45 m	Responsible for test execution:		Jörg Böhner	
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:		Cristian Enaches	
Linear plot Q and p	L	Flow period		Recovery period	
· · ·		Indata		Indata	
3700 KLX04 350.45-355.45 040902 1 CHir Q r	11.0	p₀ (kPa) =	3458		
3650 -	10.0	p; (kPa) =	3457		ł
	9.0 • P section	$p_{r}(kPa) =$	3658	n∈ (kPa) =	3458
3600 -		O_{μ} (m ³ /c)-	1 29E-04	p _F (ki u)	5450
2	-7.0	$Q_p (m/s) =$	1.29E-04	t (c) -	1200
26 3550 - 17 28 26 -	- 6.0 g	ιμ (s) –	1.005.06	ι _F (S) –	1.005.06
2 4 90 41 3500	5.0 §	S el S (-)=	1.00E-06	S el S (-)=	1.00E-06
a sub-	- 4.0	EC _w (mS/m)=			
3450	3.0	Temp _w (gr C)=	12.2		
	- 2.0	Derivative fact.=	0.09	Derivative fact.=	0.05
3400	- 1.0				
	0.0	Posults		Posults	
Elapse	d Time [h]	$O(z_1/z_2^2/z_2)$	6 3E-06	Results	
Log Log ploting derivator fl	aw pariod	Q/s (m /s)=	0.3E-00		┠────┤
Log-Log plot incl. derivates- in	ow period	I _M (m ⁻ /s)=	5.2E-00	-	ter en el e ent
		Flow regime:	transient	Flow regime:	transient
Elapsed time [h	۹ • • • • • • • • • • • • • • • • • • •	$dt_1(min) =$	3.68	$dt_1 (min) =$	0.57
10 SKB Laxemar / KLX 04 350.45 - 355.45 / Chi	FlowDim Version 2.14b (c) Golder Associates	$dt_2(min) =$	16.40	$dt_2 (min) =$	11.80
	10 °	T (m²/s) =	1.5E-05	T (m²/s) =	4.9E-05
10		S (-) =	1.0E-06	S (-) =	1.0E-06
40 1 • • • • • • • • • • • • • • • • • •	10 -1	$K_s (m/s) =$	2.9E-06	$K_s (m/s) =$	9.7E-06
ē •	5	$S_{s}(1/m) =$	2.0E-07	S _s (1/m) =	2.0E-07
E		C (m ³ /Pa) =	NA	C (m ³ /Pa) =	1.9E-09
		C _D (-) =	NA	C _D (-) =	2.1E-01
10 -1	10 -3	ξ(-) =	5.9	ξ(-) =	30.7
10 10 10 10 11	10 12 10 13 10 4	$T_{GRF}(m^2/s) =$		T _{GRF} (m ² /s) =	
0		S _{GRF} (-) =		S _{GRF} (-) =	
		D _{GRF} (-) =		D _{GRF} (-) =	
Log-Log plot incl. derivatives-	recovery period	Selected represe	ntative paran	neters.	
		dt ₁ (min) =	3.68	C (m ³ /Pa) =	1.9E-09
Elapsed time	[h]	dt ₂ (min) =	16.40	C _D (-) =	2.1E-01
10 ³ SKB Laxemar / KLX 04 350 A5 - 355 A5 / Chir	FlowDim Version 2.14b (c) Golder Associates	$T_{T}(m^{2}/s) =$	1.5E-05	ξ(-) =	5.9
	10 ³	S (-) =	1.0E-06	5()	<u>├────</u>
10		$K_s(m/s) =$	2.9E-06		t
	10 ²	$S_{s}(1/m) =$	2.0E-07		ł
	- 	Comments:			
	198 José d)	The recommended t	transmissivity of	f 1 5F-5 m2/s was de	erived from the
10	North Contraction of the Contrac	analysis of the CHi	phase, which sh	ows the best data an	d derivative
	10 ⁰	quality. The confide	ence range for th	e interval transmiss	ivity is
10		estimated to be 6.01	E-6 to 4.0E-5 m2	2/s. The flow dimens	sion displayed
l l	10 -1	during the test is 2.	The static press	ure measured at tran	sducer depth,
10 ¹ 10 ² 10 ³ EDIC	10 * 10 [±] 10 [±] 2D	Was derived from the Horner plot to a val	ue of 3457.1 kP	a.	apolation in the



Project: Oekarshamn site investigation Test type [1] Chi Area: Laxemar Test no: 1 Borehole ID: KLX04 Test start: 0440902 16.57 Test section from - to (m): 360 47-365 47 m Responsible for texecution: Cristian Enachescu section diameter. 2 τ_w (m): 0.076 Responsible for texecution: Cristian Enachescu texecution: Recovery period indeta by (KPa) = 3555 p. (KPa) = 3555 p. (KPa) = 3555 p. (KPa) = 3555 p. (KPa) = 3555 p. (KPa) = 3555 p. (KPa) = 3555 p. (KPa) = 3555 p. (KPa) = 3555 p. (KPa) = 3555 p. (KPa) = 3555 p. (KPa) = 3555 p. (KPa) = 3555 p. (KPa) = 3555 p. (KPa) = 1.000-th (S = 600 p. (KPa) = 1.000-th (S = 61 c. (KPa) = 1.000-th (S = 1.000-th		Test S	umr	narv Sheet				
Area:LaxemaTest no:1Borehole ID:KLX04Test start:040902 16:57Test section from - to (m):360.47-365.47 mResponsible for lest executoricJorg BohnerSection diameter, 2 τ_w (m):0.078Responsible for lest executoricCristian Enachescu lest executoricLinear plot Q and pIndataIndataImage: Section diameter, 2 τ_w (m):0.078Recovery periodIndataImage: Section diameter, 2 τ_w (m):0.078Recovery periodIndataImage: Section diameter, 2 τ_w (m):0.078Recovery periodIndataImage: Section diameter, 2 τ_w (m):0.078Recovery periodIndataImage: Section diameter, 2 τ_w (m):0.078Recovery periodIndataImage: Section diameter, 2 τ_w (m):0.078Recovery periodIndataImage: Section diameter, 2 τ_w (m):0.078Recovery periodIndataImage: Section diameter, 2 τ_w (m):0.078Recovery periodIndataImage: Section diameter, 2 τ_w (m):0.078Recovery periodIndataImage: Section diameter, 2 τ_w (m):0.028Section diameter, 2 τ_w (m):Image: Section diameter, 2 τ_w (m):Image: Section diameter, 2 τ_w (m):1.008-008Section diameter, 2 τ_w (m):Image: Section diameter, 2 τ_w (m):Image: Section diameter, 2 τ_w (m):1.008-008Section diameter, 2 τ_w (m):Image: Section diameter, 2 τ_w (m):Image: Section diameter, 2 τ_w (m):1.008-008Section dia	Project:	Oskarshamn site investig	ation	Test type:[1]			Chir	
Borehole ID: KLX04 Test section from - to (m): 360.47-365.47 m Responsible for Section diameter, 2 τ_w (m): 0.078 Cristian Enachescu Est evaluation: Indata (Cristian Enachescu Indata (Cristian Indata (Cristian Indata Indata (Cristian Indata Ind	Area:	Lax	emar	Test no:			1	
Test section from - to (m): 360.47-365.47 m Responsible for loss execution: Section diameter, $2\tau_w$ (m): Linear plot Q and p Linear plot Q and p (Responsible for loss execution: $Responsible for loss execution: Results$	Borehole ID:	K	LX04	Test start:		040902 16		
Sector diameter, $2r_{w}$ (m): 0.076 Responsible for Cristian Enachescu test evaluation: Linear plot Q and p Constrained particular to the second partitic to the second particular to the se	Test section from - to (m):	360.47-365.	47 m	Responsible for	Jörg Böhner			
Clinear piol Q and p Linear piol Q and p Linear piol Q and p Linear piol Q and p The set evaluation: The set	Section diameter 2.r. (m):	(076	test execution:		Crist	an Enachescu	
Linear plot Q and p Flow period Recovery period Recov	Section diameter, 2^{4} w (iii).		5.070	test evaluation:		Clist		
$\int_{Q_{1}} \int_{Q_{2}} \left(\frac{M^{2}}{M^{2}} \right)^{2} = \frac{M^{2}}{3555} + \frac{M^{2}}{3555} + \frac{M^{2}}{3555} + \frac{M^{2}}{3555} + \frac{M^{2}}{3555} + \frac{M^{2}}{3555} + \frac{M^{2}}{3555} + \frac{M^{2}}{3556} + \frac{M^{2}}{3555} + \frac{M^{2}}{3556} + \frac{M^{2}}{3566} + \frac{M^{2}}{366} + \frac{M^{2}}{3$	Linear plot Q and p			Flow period		Recovery period		
$\int_{0}^{\infty} (\mu^2 a) = \frac{3556}{3558}$ $\int_{0}^{\infty} (\mu^2 a) = \frac{3556}{3558}$ $\int_{0}^{\infty} (\mu^2 a) = \frac{3556}{3558}$ $\int_{0}^{\infty} (\mu^2 a) = \frac{3558}{358}$ $\int_{0}^{\infty} (\mu^2 a) = \frac{3558}{358}$ $\int_{0}^{\infty} (\mu^2 a) = \frac{3558}{358}$ $\int_{0}^{\infty} (\mu^2 a) = \frac{3568}{358}$ $\int_{0}^{\infty} (\mu^2 a) = \frac{3558}{358}$ $\int_{0}^{\infty} (\mu^2 a) = \frac{3558}{358}$ $\int_{0}^{\infty} (\mu^2 a) = \frac{3568}{358}$ $\int_{0}^{\infty} (\mu^2 a) = \frac{3558}{358}$ $\int_{0}^{\infty} (\mu^2 a) = \frac{358}{358}$ $\int_{0}^{\infty} (\mu^2 a) = \frac{358}{358}$ $\int_{0}^{\infty} (\mu^2 a) = \frac{358}{358}$ $\int_{0}^{\infty} (\mu^2 a) = \frac{358}{378}$ $\int_{0}^{\infty} (\mu^2 a) = \frac{358}{378}$ $\int_{0}^{\infty} (\mu^2 a) = \frac{358}{378}$ $\int_{0}^{\infty} (\mu^2 a) = \frac{358}{378}$ $\int_{0}^{\infty} (\mu^2 a) = \frac{358}{378}$ $\int_{0}^{\infty} (\mu^2 a) = \frac{358}{378}$ $\int_{0}^{\infty} (\mu^2 a) = \frac{378}{378}$ $\int_{0}^{\infty} (\mu^2 a) = \frac{378}{378}$ $\int_{0}^{\infty} (\mu^2 a) = \frac{378}{378}$ $\int_{0}^{\infty} (\mu^2 a) = \frac{378}{378}$ $\int_{0}^{\infty} (\mu^2 a) = \frac{378}{378}$ $\int_{0}^{\infty} (\mu^2 a) = \frac{378}{378}$ $\int_{0}^{\infty} (\mu^2 a) = \frac{378}{378}$ $\int_{0}^{\infty} (\mu^2 a) = \frac{378}{378}$ $\int_{0}^{\infty} (\mu^2 a) = \frac{378}{378}$ $\int_{0}^{\infty} (\mu^2 a) = \frac{378}{378}$ $\int_{0}^{\infty} (\mu^2 a) = \frac{378}{378}$ $\int_{0}^{\infty} (\mu^2 a) = \frac{378}{378}$ $\int_{0}^{\infty} (\mu^2 a) = \frac{378}{378}$ $\int_{0}^{\infty} (\mu^2 a) = \frac{378}{378}$ $\int_{0}^{\infty} (\mu^2 a) = \frac{378}{378}$ $\int_{0}^{\infty} (\mu^2 a) = \frac{378}{38}$ $\int_{0}^{\infty} (\mu^2 a) = \frac{378}{38}$ \int_{0	3800	1	0.7	Indata		Indata		
$\int_{a_{1}}^{b_{1}} (k^{2}a) = \frac{3553}{72E \cdot 0^{2}}$ $\int_{a_{1}}^{b_{1}} (k^{2}a) = \frac{3553}{72E \cdot 0^{2}}$ $\int_{a_{1}}^{b_{1}} (k^{2}a) = \frac{3752}{72E \cdot 0^{2}}$ $\int_{a_{1}}^{b_{1}} (k^{2}a) = \frac{3752}{72E \cdot 0^{2}}$ $\int_{a_{1}}^{b_{1}$	KLX04_360.47-365.47_040902_1_CHir_Q_r	F		p ₀ (kPa) =	3556			
$\int_{Q_{1}} \left(\frac{1}{Q_{2}} + \frac$	3750 -		0.6	p _i (kPa) =	3555			
$\int_{0}^{2} \left(\frac{m^{2}}{r_{0}} \right)^{2} = \frac{7.27E-06}{r_{0}} = \frac{100E-06}{r_{0}} \le 1 \le (-) = 100E-06 \le 1 \le (-) = 100E-06 \le 1 \le (-) = 100E-06 \le 1 \le (-) = 100E-06 \le 1 \le (-) = 100E-06 \le 1 \le (-) = 100E-06 \le 1 \le (-) = 100E-06 \le 1 \le (-) = 100E-06 \le 1 \le (-) = 100E-06 \le 1 \le (-) = 100E-06 \le 1 \le (-) = 100E-06 \le 1 \le (-) = 100E-06 \le 1 \le (-) = 10E-07 \le (-) = 10E-07 = 10E-07 = 10E-07 \le (-) = 10E-06 \le (-) = 10E-07 \le (-) = 10E-06 \le (-) = 10E-06 \le (-) = 10E-06 \le (-) = 10E-07 \le (-) = 10E-07 \le (-) = 10E-07 \le (-) = 10E-07 \le (-) = 10E-07 \le (-) = 10E-07 \le (-) = 10E-07 \le (-) = 10E-06 \le (-) = 10E-07 \le (-) = 10$	3700 -	P section P above		p _p (kPa) =	3749	p _F (kPa) =	3553	
$\int_{C_{1}}^{2} \int_{C_{2}}^{2} $			- 0.5	Q _p (m ³ /s)=	7.27E-06			
$Set S(\cdot) = 1.00E-06 Set S(\cdot) = 1.00E-06$ $Set S(\cdot) = 1.00E-06 Set S(\cdot) = 1.00E-06$ $Set S(\cdot) = 1.00E-06 Set S(\cdot) = 1.00E-06$ $Set S(\cdot) = 1.00E-06 Set S(\cdot) = 1.00E-06$ $Set S(\cdot) = 1.24$ $Derivative fact = 0.13 Derivative fact = 0.02$ $Q/S(m^2/S) = 3.7E-07$ $Dor regime: transient Flow regime: transient flow regime: tran$	e 3650 - 85		0.4 [uiw]	tp (s) =	1200	t _F (s) =	600	
$ \frac{1}{1000} = \frac{1}{10000} = \frac{1}{10000} = \frac{1}{10000} = \frac{1}{10000} = \frac{1}{10000} = \frac{1}{10000} = \frac{1}{10000} = \frac{1}{10000} = \frac{1}{100000} = \frac{1}{10000000000000000000000000000000000$	2 3600 		on Rate	S el S [*] (-)=	1.00E-06	S el S [*] (-)=	1.00E-06	
$ \frac{1}{2} = 1$	2 3550	- i	0.3 Diecti	EC _w (mS/m)=				
Derivative fact.= 0.13 Derivative fact.= 0.02 Derivative fact.= 0.02 Derivative			0.2	Temp _w (gr C)=	12.4			
$\frac{1}{2} = \frac{1}$	3500			Derivative fact.=	0.13	Derivative fact.=	0.02	
Results Results Q/s (m ² /s)= $3.7E-07$ Log-Log plot incl. derivates- flow period $\frac{1}{100}$ \frac	3450 -		0.1					
$ \frac{Q}{Q_{S}(m^{2}/s)} = 3.7E-07 $ $ \frac{Q}{Q_{S}(m^{2}/s)} = 3.7E-07 $ $ \frac{Q}{Q_{S}(m^{2}/s)} = 3.0E-07 $ $ \frac{Q}{Q_{S}(m^{2}/s)} = 3.0E-07 $ $ \frac{Q}{Q_{S}(m^{2}/s)} = 3.0E-07 $ $ \frac{Q}{Q_{S}(m^{2}/s)} = 1.0E \text{ vergine: } \text{ transient } \text{ flow regime: } \text{ flow regime: } flow regime$	3400 0.00 0.20 0.40	0.60 0.80 1.00 1.2	- 0.0 20	Results		Results		
Log-Log plot incl. derivates- flow period $T_M (m^2/s) =$ $3.0E-07$ Image: transition of the second se	Elaps	eu rane (nj		Q/s (m²/s)=	3.7E-07			
Flow regime: transient Flow regime: transient d_1 (min) = 0.61 d_1 (min) = 0.59 d_2 (min) = 17.83 d_2 (min) = 5.78 d_3 (min) = 17.83 d_4 (min) = 0.59 d_2 (min) = 17.83 d_4 (min) = 0.59 d_2 (min) = 17.83 d_4 (min) = 0.59 d_5 (min) = 17.83 d_4 (min) = 0.59 d_5 (min) = 17.83 d_4 (min) = 0.61 d_5 (min) = 17.83 d_5 (min) = 2.0E-07 d_5 (min) = 2.0E-07 d_5 (min) = 2.0E-07 d_5 (min) = 2.0E-07 d_5 (min) = 2.0E-07 d_5 (min) = 2.0E-07 d_5 (min) = 2.0E-07 d_5 (min) = 2.0E-07 d_5 (min) = 2.0E-07 d_5 (min) = 2.0E-07 d_5 (min) = 2.0E-07 d_5 (min) = 2.0E-07 d_5 (min) = 0.61 d_5 (min) = 0.61 d_5 (min) = 0.61 d_5 (min) = 2.0E-07 d_5 (min) = 2.0E-07 d_5 (min) = 0.61 d_5 (min)	Log-Log plot incl. derivates- fl	ow period		T _M (m²/s)=	3.0E-07			
$\int_{a_{1}}^{a_{1}} \int_{a_{2}}^{a_{2}} \int_{a_{2}}^$				Flow regime:	transient	Flow regime:	transient	
$\int_{a_{1}}^{a_{2}} \int_{a_{2}}^$	Elapsed time (ŋ		dt ₁ (min) =	0.61	dt ₁ (min) =	0.59	
$\frac{1}{2} = \frac{1}$	10 ³		10 ²	dt ₂ (min) =	17.83	dt ₂ (min) =	5.78	
$S(-) = 1.0E-06 S(-) = 1.0E-06$ $S(-) = 1.0E-06 S(-) = 1.0E-06 S(-) = 1.0E-06$ $K_{6} (m/s) = 1.8E-07 K_{8} (m/s) = 3.3E-07$ $S_{6} (1/m) = 2.0E-07 S_{8} (1/m) = 2.0E-07$ $S_{6} (1/m) = 2.0E-07 S_{8} (1/m) = 2.0E-07$ $S_{6} (1/m) = 2.0E-07 S_{8} (1/m) = 2.0E-07$ $S_{6} (1/m) = 2.0E-07 S_{8} (1/m) = 2.0E-07$ $S_{6} (1/m) = 0.61 C (m^{3}/Pa) = 6.9E-11$ $D_{GRF}(-) = D_{GRF}(-) = D_{GRF}(-) = 0$ $D_{GRF}(-) = 0.61 C (m^{3}/Pa) = 6.9E-11$ $D_{C}(-) = 1.0E-06$ $T_{T} (m^{2}/s) = 1.8E-07 S_{6} (-) = 1.8E-07$ $S_{6} (1/m) = 2.0E-07$	300.47-305.477 Uil	(*)		T (m²/s) =	9.2E-07	T (m²/s) =	1.6E-06	
$K_{s}(m/s) = 1.8E-07 K_{s}(m/s) = 3.3E-07 S_{s}(1/m) = 2.0E-07 S_{s}(1$	10 2		10 1	S (-) =	1.0E-06	S (-) =	1.0E-06	
$\int_{a_{1}}^{a_{2}} \int_{a_{2}}^$	• • • • • • • • • • • • • • • • • • •			K _s (m/s) =	1.8E-07	$K_s (m/s) =$	3.3E-07	
$\int_{a}^{b} \int_{a$	10	:	10 °	S _s (1/m) =	2.0E-07	S _s (1/m) =	2.0E-07	
$\int_{a}^{b} \int_{a$	1400 (1445	:	(Inim) (Inim)	C (m³/Pa) =	NA	C (m³/Pa) =	6.9E-11	
$\xi(.) = \frac{8.6}{\xi(.)} = \frac{20.9}{1000}$ $\frac{\xi(.) = \frac{8.6}{\xi(.)} = \frac{20.9}{1000}$ $\frac{\xi(.) = \frac{8.6}{\xi(.)} = \frac{20.9}{1000}$ $\frac{\xi(.) = \frac{8.6}{\xi(.)} = \frac{20.9}{1000}$ $\frac{\xi(.) = \frac{8.6}{\xi(.)} = \frac{20.9}{1000}$ $\frac{\xi(.) = \frac{8.6}{\xi(.)} = \frac{1000}{1000}$ $\frac{\xi(.) = \frac{8.6}{\xi(.)} = \frac{1000}{1000}$ $\frac{\xi(.) = \frac{8.6}{\xi(.)} = \frac{1000}{1000}$ $\frac{\xi(.) = \frac{8.6}{\xi(.)} = \frac{1000}{1000}$ $\frac{\xi(.) = \frac{8.6}{\xi(.)} = \frac{1000}{1000}$ $\frac{\xi(.) = \frac{1000}{1000}$ $\frac{\xi(.) = \frac{1000}{1000}$ $\frac{\xi(.) = \frac{1000}{1000}$ $\frac{\xi(.) = \frac{1000}{1000}$ $\frac{\xi(.) = \frac{1000}{1000}$ $\frac{\xi(.) = \frac{1000}{1000}$ $\frac{\xi(.) = \frac{1000}{1000}$ $\frac{\xi(.) = \frac{1000}{1000}$ $\frac{\xi(.) = \frac{1000}{1000}$ $\frac{\xi(.) = \frac{1000}{1000}$ $\frac{\xi(.) = \frac{1000}{1000}$ $\frac{\xi(.) = \frac{1000}{1000}$ $\frac{\xi(.) = \frac{1000}{1000}$ $\frac{\xi(.) = \frac{1000}{1000}$ $\frac{\xi(.) = \frac{1000}{1000}$	10	the second second second second second second second second second second second second second second second s	10 ⁻¹ ∉	C _D (-) =	NA	C _D (-) =	7.6E-03	
$\frac{1}{10^{-1}} \xrightarrow{10^{-1}} 10^{$	10 -1	•		ξ(-) =	8.6	ξ(-) =	20.9	
$T_{GRF}(m^2/s) = T_{GRF}(m^2/s) =$ $T_{GRF}(m^2/s) = T_{GRF}(m^2/s) =$ $T_{GRF}(m^2/s) = T_{GRF}(m^2/s) =$ $T_{GRF}(-) = D_{GRF}(-) =$ $D_{GRF}(-) = D_{GRF}(-) =$ $D_{GRF}(-) = 0$ $Selected representative parameters.$ $dt_1 (min) = 0.61 C (m^3/Pa) = 6.9E-11$ $dt_2 (min) = 17.83 C_D (-) = 7.6E-03$ $T_T (m^2/s) = 9.2E-07 \xi (-) = 8.6$ $S (-) = 1.0E-06$ $S (-) = 1.0E-06$ $S (-) = 1.8E-07$ $S_s (1/m) = 2.0E-07$ $Comments:$ The recommended transmissivity of 9.2E-7 m2/s was derived from the analysis of the CHi phase, which shows the best data and derivative analysis of the CHi phase, which shows the best data and derivative analysis of the CHi phase, which shows the best data and derivative analysis of the CHi phase, which shows the best data and derivative analysis of the CHi phase, which shows the best data and derivative analysis of the CHi phase, which shows the best data and derivative analysis of the CHi phase, which shows the best data and derivative analysis of the CHi phase, which shows the best data and derivative analysis of the CHi phase, which shows the best data and derivative analysis of the CHi phase, which shows the best data and derivative analysis of the CHi phase, which shows the best data and derivative analysis of the CHi phase, which shows the best data and derivative analysis of the CHi phase, which shows the best data and derivative analysis of the CHi phase.			10					
$S_{GRF}(-) = S_{GRF}(-) = D_{GRF}(-) = D_{GRF}(-) = D_{GRF}(-) = D_{GRF}(-) = D_{GRF}(-) = D_{GRF}(-) = D_{GRF}(-) = D_{GRF}(-) = D_{GRF}(-) = D_{GRF}(-) = D_{GRF}(-) = D_{GRF}(-) = D_{GRF}(-) = 0.61 C (m^3/Pa) = 6.9E-11 dt_2 (min) = 17.83 C_D (-) = 7.6E-03 T_T (m^2/s) = 9.2E-07 \xi (-) = 7.6E-03 T_T (m^2/s) = 9.2E-07 \xi (-) = 8.6 S (-) = 1.0E-06 M_{S}(-) = 0.61 C (m^3/Pa) = 0.61 C (m^3/P$	10 ¹¹ 10 ¹²	10 ¹³ 10 ¹⁴ 10 ¹⁵		T _{GRF} (m ² /s) =		T _{GRF} (m²/s) =		
$D_{GRF}(-) = D_{$				S _{GRF} (-) =		S _{GRF} (-) =		
Log-Log plot incl. derivatives- recovery periodSelected representative parameters. $u_1 (min) = 0.61 C (m^3/Pa) = 6.9E-11$ $u_2 (min) = 17.83 C_D (-) = 7.6E-03$ $u_2 (min) = 17.83 C_D (-) = 7.6E-03$ $u_1 (min) = 0.2E-07 \xi (-) = 8.6$ $u_2 (min) = 1.8E-07$ $u_3 (min) = 2.0E-07$ $u_3 (min) = 0.2E-07$ <th></th> <th></th> <th></th> <th>$D_{GRF}(-) =$</th> <th></th> <th>D_{GRF} (-) =</th> <th></th>				$D_{GRF}(-) =$		D _{GRF} (-) =		
$T_{T} (m^{2}/s) = 0.61C (m^{3}/Pa) = 0.9E-11$ $\frac{dt_{1} (min) = 0.61C (m^{3}/Pa) = 0.9E-11}{dt_{2} (min) = 17.83 C_{D} (-) = 7.6E-03$ $T_{T} (m^{2}/s) = 9.2E-07 \xi (-) = 8.6$ $S (-) = 1.0E-06$ $K_{s} (m/s) = 1.8E-07$ $S_{s} (1/m) = 2.0E-07$ $Comments:$ The recommended transmissivity of 9.2E-7 m2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence tange for the interval transmissivity is	Log-Log plot incl. derivatives-	recovery period		Selected repres	entative paran	neters.		
$\frac{10^{-1}}{10^{-1}}$ $\frac{10^{-1}}{10^{-1}}$				dt_1 (min) =	0.61	C (m³/Pa) =	6.9E-11	
$T_{T} (m^{2}/s) = 9.2E-07 \xi (-) = 8.6$ $S (-) = 1.0E-06$ $K_{s} (m/s) = 1.8E-07$ $S_{s} (1/m) = 2.0E-07$ $Comments:$ The recommended transmissivity of 9.2E-7 m2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is	Elapsed time	h] 	1	dt_2 (min) =	17.83	C _D (-) =	7.6E-03	
$S(-) = 1.0E-06$ $K_{s} (m/s) = 1.8E-07$ $S_{s} (1/m) = 2.0E-07$ Comments: The recommended transmissivity of 9.2E-7 m2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is	360.47-365.47 / Chir	FlowDim Version 2.14b (c) Golder Associates	ł	T_{T} (m ² /s) =	9.2E-07	ξ(-) =	8.6	
$K_{s} (m/s) = 1.8E-07$ $S_{s} (1/m) = 2.0E-07$ Comments: The recommended transmissivity of 9.2E-7 m2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is			10 2	S (-) =	1.0E-06			
$S_s (1/m) = 2.0E-07$ Comments: The recommended transmissivity of 9.2E-7 m2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is	10 '		-	K _s (m/s) =	1.8E-07			
Comments: The recommended transmissivity of 9.2E-7 m2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is			Ľ.	S _s (1/m) =	2.0E-07			
The recommended transmissivity of 9.2E-7 m2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is		· · · · · · · · · · · · ·	10 ID	Comments:				
analysis of the CHI phase, which shows the best data and derivative			pp0.(b-p	The recommended	transmissivity of	9.2E-7 m2/s was de	rived from the	
	10 -1 -		10 0	quality. The confid	e puase, which sh lence range for th	ows me dest data an	u derivative	
estimated to be 5.0E-7 to 2.0E-6 m2/s. The flow dimension displayed			ł	estimated to be 5.0	E-7 to 2.0E-6 m2	2/s. The flow dimens	sion displayed	
during the test is 2. The static pressure measured at transducer depth,			10 -1	during the test is 2.	The static press	ure measured at tran	sducer depth,	
was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 3553.3 kPa.	10 ⁻⁷ 10 ⁻⁷ 10 ⁻⁷	то ² то ⁴ то	평	was derived from t Horner plot to a va	he CHir phase us lue of 3553.3 kP	ing straight line extr a.	apolation in the	



Test Sur	mm	ary Sheet			
Project: Oskarshamn site investigati	tion <mark>1</mark>	Test type:[1]			Chir
Area: Laxen	nar T	Fest no:			1
Borehole ID: KLX	X04 T	Fest start:			040902 22:37
Test section from - to (m): 370.47 - 375.47	7 m F	Responsible for est execution:		Jörg Böhne	
Section diameter, 2·r _w (m): 0.0	076 F	Responsible for		Cristian Enachesc	
l inear plot Q and p	E	Flow period		Recovery period	
		ndata		Indata	
3900	n	hatta = hatt	3649	induta	
KLX04_370.47-375.47_040902_1_CHir_Q_r	n); (kPa.) =	3647		
P section = 0.12	n	(kPa) =	3830	n-(kPa)=	3647
3800 - Pabove P below	4	$p_p(K a) = 0$	1 07E 06	ρ _F (Ki α) –	5047
⊊ ³⁷⁵⁰ ·	_ t	\mathcal{Q}_{p} (m ² /s)=	1.0/E-00	t (a) -	000
		p (s) =	1.005.06	$l_F(S) =$	900
	ection R	Sel S (-)=	1.00E-06	S el S (-)=	1.00E-06
B 3850	ŝ L	=C _w (mS/m)=	10 (
		emp _w (gr C)=	12.6		
	D	Derivative fact.=	0.02	Derivative fact.=	0.03
3550 0.02					
3900	L				
0.00 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.80 1.80 Elapsed Time (h)	F	Results		Results	_
	C	Q/s (m²/s)=	5.5E-08		
Log-Log plot incl. derivates- flow period	Т	Γ _M (m²/s)=	4.5E-08		
	F	low regime:	transient	Flow regime:	transient
4 3 Elapsed time [h]	d	$dt_1 (min) =$	0.95	dt ₁ (min) =	*
10 10 10 10 10 10 10 10 10 10 10 10 10 1	d	$dt_2 (min) =$	5.75	dt ₂ (min) =	*
SIGAT-SISAT/Citil FloxDim Version 2.4 db (c) Golder Associates 10	Τ	$\Gamma(m^2/s) =$	5.2E-08	T (m²/s) =	3.7E-07
	S	S (-) =	1.0E-06	S (-) =	1.0E-06
10 -	ĸ	$K_{s}(m/s) =$	1.0E-08	$K_s (m/s) =$	7.3E-08
	. 5	$S_{s}(1/m) =$	2.0E-07	S _s (1/m) =	2.0E-07
	(linin l	$C(m^{3}/Pa) =$	NA	C (m ³ /Pa) =	1.2E-11
3 	¹⁰ 10	$C_{\rm D}(-) =$	NA	$C_{\rm D}(-) =$	1.3E-03
10	بع	· (-) =	0.4	۶ (-) =	33.3
10-1	ר ו	, (<i>)</i>			
0.03		$\int_{ODE} (m^2/s) =$		$T_{opc}(m^2/s) =$	
10 ² 10 ³ 10 ⁴ 10 ⁸ 10 ⁸	S	$S_{GRF}(-) =$		$S_{GRF}(-) =$	
	Г	$D_{CDE}(-) =$		$D_{\text{ORT}}(-) =$	
l og-l og plot incl. derivatives- recovery period	9	Selected represe	ntative param	eters	
	d	dt₁ (min) =	0.95	$C (m^3/P_2) =$	1 2F-11
Elapsed time [h]	4	dt_2 (min) =	5.56	$C_{D}(-) =$	1.3E-03
10 ² FlowDim Version 2.14b	, T	$(m^2/c) =$	5 2E-08	ε() -	0.4
SNEL Laxemar / KX. 04 370.47 - 375.47 / Chir (c) Golder Associates 300	I S	$S_{(-)} =$	1.0E-06	ς(-) –	0.4
	2	(m/s) =	1.0E-00		
10 ¹		$C_{s}(11/3) = \frac{1}{2}$	2.05.07		
30		$S_s(1/11) =$	2.0E-07		
	U lifeal			COE 9 2/2	
	6 I	he recommended t	ransmissivity of	5.2E-8 m2/s was do ows the best data an	d derivative
10 "	a	juality. The confide	ence range for th	e interval transmiss	ivity is
	e	estimated to be 3.0E	E-8 to 9.0E-8 m2	2/s. The flow dimens	sion displayed
10 °	d	luring the test is 2.	The static press	ure measured at tran	sducer depth,
10 ⁴ 10 ² 10 ³ 10 ⁴ 10 ⁵	W	vas derived from th	e CHir phase us	ing straight line ext	rapolation in the
	E	normer plot to a value	ue of 364/.1 kP	a.	

	Test S	umn	narv Sheet			
Project:	Oskarshamn site investig	ation	Test type:[1]			Chir
Area:	Lax	emar	Test no:			1
Borehole ID:	KI	LX04	Test start:			040903 05:55
Test section from - to (m):	375.47-380.47 m		Responsible for test execution:		Jörg Böhn	
Section diameter, 2·r _w (m):	(0.076	Responsible for		Crist	ian Enachescu
l inear plot Ο and p			Elow period		Recovery period	
			Indata		Indata	
3900		0.7	n _o (kPa) =	3698	inuata	
		.06	p ₀ (kPa) =	3694		╂────┤
3850 -	P section	0.0	$p_{l}(kPa) =$	3884	n_(kPa)=	3694
		0.5	$p_{p}(R a) = 0$	5 38E 06	ρ _F (Ki α) –	5094
3800 ·		F	Q _p (m /s)= tp (s) =	5.58E-00	t_ (s) =	660
4 9 13 9 2750		ate []/mi	(p(s)) =	1.00E.06	$(3) = 0^{*}(3)$	1 00E 06
	╫┼───┥	jection R	SelS (-)= EC (mS/m)=	1.00E-00	Sel S (-)=	1.0012-00
3700		E	$LC_w (IIIS/III) =$	12.7		
		0.2	Derivative fact.=	12.7	Derivative fact.=	0.02
3650 -		0.1				<u> </u>
3800		- 0.0				
0.00 0.20 0.40 Els	0.60 0.80 1.00 1.2 apsed Time [h]	20	Results		Results	
			Q/s (m^{2}/s)=	2.8E-07		
Log-Log plot incl. derivates-	flow period		Τ _M (m²/s)=	2.3E-07		
			Flow regime:	transient	Flow regime:	transient
Elapsed 10	me [h] 10, ⁻²	-	dt_1 (min) =	1.03	dt ₁ (min) =	0.71
10 1 SKB Laxemar / KLX 04 375.47 - 380.47 / Chi	FlowDim Version 2.14b (c) Golder Associates	-	dt_2 (min) =	15.45	dt_2 (min) =	2.61
		3	T (m²/s) =	2.3E-07	T (m²/s) =	1.0E-06
		10 °	S (-) =	1.0E-06	S (-) =	1.0E-06
10 0		ł	$K_s (m/s) =$	4.6E-08	$K_s (m/s) =$	2.1E-07
1000		0.3	$S_{s}(1/m) =$	2.0E-07	$S_{s}(1/m) =$	2.0E-07
1,000,1	•	, 10 (lui)	C (m³/Pa) =	NA	C (m³/Pa) =	7.1E-11
10 -1	:	4	$C_D(-) =$	NA	C _D (-) =	7.9E-03
	•	0.03	ξ(-) =	-1.3	ξ(-) =	15.1
		10 -2	$T_{opr}(m^2/s) =$		$T_{ops}(m^2/s) =$	┢────┤
10 ¹ 10 ²	10 ⁻³ 10 ⁻⁴ 10 tD	5	$S_{GRF}(-) =$		$S_{GRF}(-) =$	╉────┤
			$D_{GRF}(-) =$		$D_{GRF}(-) =$	
Log-Log plot incl. derivatives	s- recovery period		Selected represe	ntative param	neters.	
			dt_1 (min) =	1.03	C (m ³ /Pa) =	7.1E-11
Elapsed time	[h]		dt_2 (min) =	15.45	$C_{D}(-) =$	7.9E-03
10 2 SKB Laxemar / KLX 04 375 47 - 380 47 / Chir	FlowDim Version 2.14b (c) Golder Associates		T⊤ (m²/s) =	2.3E-07	ξ(-) =	-1.3
	3	100	S (-) =	1.0E-06		
0 0 00 00 00 00 000000			K _s (m/s) =	4.6E-08		
10 1	11	10 2	S _s (1/m) =	2.0E-07		
	3	10 F	Comments:			
The recommended transmissivity of 2.5E-7 m2/s was derived from the						
analysis of the CHi phase, which shows the best data and derivative						
	······································		quality. The confide	ence range for the $\frac{1}{2}$ s to $\frac{1}{2}$ or $\frac{1}{2}$	e interval transmiss	ivity is
· · · · · · · · · · · · · · · · · · ·	3	8	estimated to be 9.01 during the test is 2	2-8 to 4.0E-7 m. The static press	L/S. The flow dimens	sion displayed
L	······	10 ⁰	was derived from th	e CHir phase us	ing straight line ext	rapolation in the
10 10 ⁻ tDM	10 10 [°] 10 [°]		Horner plot to a val	ue of 3693.3 kP	a.	



	Test Su	mn	nary Sheet				
Project:	Oskarshamn site investiga	ation	Test type:[1]			Pi	
Area:	Laxe	emar	Test no:			1	
Borehole ID:	KL	.X04	Test start:			040903 09:25	
Test section from - to (m):	385.47-390.4	17 m	Responsible for		Jörg Böhne		
Section diameter, 2·r _w (m):	0.076		Responsible for		Cristian Enachescu		
l inear plot Q and p			Flow period		Recovery period		
			Indata		Indata		
4050 KLX	0. X04_385.47-390.47_040903_1_PI_Q_r	1.5	p₀ (kPa) =	3797	indutu		
4000	P section Paove		p; (kPa) =	3807			
		1,4	$p_{\rm p}({\rm kPa}) =$	4009	p⊢(kPa) =	3918	
3950 -			O_{1} (m ³ /c)=	-		5710	
[edd	0.	.3 E	$\frac{d_p(m/s)}{tp(s)} =$	-	t₌ (s) =	3600	
3900 - 380 -	•	Rate []/m	\$ el \$ [*] ()−	-	ς d S [*] ()-	1 00E-06	
8 5 8 3850 -	•	Injection	EC., (mS/m)=		0 ei 0 (-)-		
⁸		2 -	Temp(ar C)=	12.9			
3800	•		Derivative fact =	-	Derivative fact =	0.12	
3750 -	- 0.	.1				0.12	
3700	•						
3700 0.00 0.20 0.40 0.60 0.80 1.00 1.20 1.40 1.60 1.80 Elapsed Time [h]		Results		Results			
	· · ·		Q/s (m²/s)=	NA			
Log-Log plot incl. derivates- fi	ow period		T _M (m²/s)=	NA	-	to a set	
			Flow regime:	transient	Flow regime:	transient	
			$dt_1(min) =$	-	$dt_1 (min) =$	^ *	
			$dt_2 (min) =$	-	$dt_2 (min) =$		
			T (m²/s) =	NA	$T(m^2/s) =$	8.3E-12	
			S (-) =	NA	S (-) =	1.0E-06	
			$K_s(m/s) =$	NA	$K_s (m/s) =$	1.7E-12	
Not Ar	nalysed		$S_s(1/m) =$	NA	$S_s(1/m) =$	2.0E-07	
			C (m³/Pa) =	NA	C (m³/Pa) =	8.5E-12	
			$C_{\rm D}(-) =$	NA	$C_{\rm D}(-) =$	9.4E-04	
			ξ(-) =	NA	ξ(-) =	2.4	
			T _{GRF} (m ² /s) =		T _{GRF} (m ² /s) =		
			$S_{GRF}(-) =$		$S_{GRF}(-) =$		
			D _{GRF} (-) =		D _{GRF} (-) =		
Log-Log plot incl. derivatives-	recovery period		Selected represe	entative param	neters.	-	
			dt ₁ (min) =	*	C (m ³ /Pa) =	8.5E-12	
			dt ₂ (min) =	*	C _D (-) =	9.4E-04	
Elapsed time [[h]		T _T (m²/s) =	8.3E-12	ξ(-) =	2.4	
SKB Laxemar / KLX 04 385.47 - 390.47 / Pi	FlowDim Version 2.14b (c) Golder Associates	3	S (-) =	1.0E-06			
	1 State and a state of the stat	510 °	K _s (m/s) =	1.7E-12			
· · · · · · · · · · · · · · · · · · ·			S _s (1/m) =	2.0E-07			
		0.3	Comments:				
		*: IARF not measured					
		10 appoint coa	The recommended transmissivity of 8.3E-12 m2/s was derived from the				
10 ⁻¹	• :	0.03	the inherent uncertainties related to the measurement (e.g. specially the				
			measurement of the wellbore storage coefficient) and to the analysis				
			process (e.g. numer	ic distortion who	en calculating the de	erivative and	
10 ⁰ 10 ¹	10 ² 10 ³ 10 ⁴		pressure history effe	ects), the confidence $12 \text{ to } 5E 11 \text{ m}^2$	ence range for the tr	ansmissivity is	
			derived	12 W JE-11 Ifi2/	5. INO STATIC PLESSURE		

Test Summary Sheet							
Project:	Oskarshamn site investi	gation	Test type:[1]			Pi	
Area:	La:	xemar	Test no:			1	
Borehole ID:	ł	KLX04	Test start:			040903 12:21	
Test section from - to (m):	390.48-395.48 m		Responsible for		Jörg Böhner		
Section diameter, $2 \cdot r_w$ (m):		0.076	Responsible for		Cristian Enachescu		
Linear plot Q and p			Flow period		Recovery period		
			Indata		Indata		
4100 KLX04_390.48-395.48_040903_1_PI_Q_r		0.50	p₀ (kPa) =	3845			
4050 -		- 0.45	p _i (kPa) =	3859		<u> </u>	
	P section	0.40	$p_{p}(kPa) =$	4061	p _∈ (kPa) =	3892	
4000 -	P above P below	- 0.35	$O_{(m^{3}/s)} =$	-	P1 ()		
- 3950 		- ^{0.30} Ξ	tp (s) =	-	t⊧(s) =	2400	
9 8 9 9 3900 -		- 0.25 B	\$ 0 5 [*] ()-	1 00E-06	ς d S [*] ()-	1.00E-06	
wintholo P		Injection	5 er 3 (-)- FC (mS/m)=	1.002.00	3 el 3 (- <i>)</i> -	1.002.00	
⁸ 3850	2	- 0.20 -	Temp (ar C)=	12.9			
3800 -	5	- 0.15	Derivative fact =	12.9	Derivative fact =	0.02	
3750 -	•	- 0.10		-		0.02	
3700	8	0.00	Begulte		Deculto		
0.00 0.20 0.40 0.60 Elap	0.80 1.00 1.20 1 sed Time [h]	.40			Results		
Log Log ploting, derivator, f	ilow ported		Q/s (m ⁻ /s)=				
Log-Log plot incl. derivates- i	low period		I _M (m ⁻ /s)=	INA	Flow regime:	transiant	
			riow regime.	transient	riow regime.	transient *	
		$dl_1(min) =$	-	$dt_1(min) =$	*		
		$dl_2(min) =$	-	$dl_2 (min) =$	0.75.44		
		T (m²/s) =		T (m²/s) =	8.7E-11		
			S (-) =		S (-) =	1.0E-06	
			κ_{s} (m/s) =		κ_{s} (m/s) =	1.7E-11	
Not A	nalysed		$S_{s}(1/11) =$		$S_{s}(1/11) =$	2.0E-07	
			C (m°/Pa) =		C (m°/Pa) =	2.0E-11	
			$C_{\rm D}(-) =$		$C_{\rm D}(-) =$	2.1E-03	
			ξ(-) =	NA	ζ(-) =	0.8	
			2		2		
			$T_{GRF}(m^2/s) =$		$T_{GRF}(m^2/s) =$		
			$S_{GRF}(-) =$		$S_{GRF}(-) =$		
			$D_{\text{GRF}}(-) =$		$D_{\text{GRF}}(-) =$		
Log-Log plot incl. derivatives	- recovery period		dt (min) -	*		2 0E 11	
			$dt_1(min) =$	*	C (m°/Pa) =	2.0E-11	
10 ⁻³ Elapsed time	[h] 10 ⁻¹ 10 ⁻⁰ 10	n ¹	$dl_2(mm) =$	07511	$C_{\rm D}(-) =$	2.1E-03	
10 1 SKB Laxemar / KLX 04 390.48 - 395.48 / Pi	FlowDim Version 2.14b (c) Golder Associates		$I_{T}(m^{-}/s) =$	0.7E-11	ς(-) =	0.0	
		0.3	3(-) = -	1.0E-00			
10 ⁵ · · · · · · · · · · · · · · · · · · ·			$R_s(III/s) =$	1.7E-11			
		$S_s(1/11) =$	2.0E-07				
					29.7E 11 2/aa	dominand from the	
		analysis of the PI pl	hase assuming a	flow dimension of 2	2. Considering		
10 ⁻¹			the inherent uncerta	inties related to	the measurement (e	.g. specially the	
			measurement of the	wellbore storag	e coefficient) and to	the analysis	
		0.003	process (e.g. numer	ic distortion whe	en calculating the de	erivative and	
10 [°] 10 ¹	- 10 ⁻² 10 ⁻³ 10	4 10 -3	estimated to be 7E.	$11 \text{ to } 4\text{E}-10 \text{ m}^2$	s. No static pressure	e could be	
			derived.	10 11/2/	Probuit		

	Test Summ	nary Sheet			
Project:	Oskarshamn site investigation	Test type:[1]			Pi
Area:	Laxemar	Test no:			1
Borehole ID:	KLX04	Test start:	040903 14		
Test section from - to (m):	395.48-400.48 m	Responsible for test execution:	Jörg Böh		
Section diameter, 2·r _w (m):	0.076	Responsible for		Crist	ian Enachescu
Linear plot Q and p		Flow period		Recovery period	ĺ
p q p		Indata		Indata	
4200 P section KLX04_395.48-400.48_040903_1_PI_Q_r		p₀ (kPa) =	3895		
A P above 4150 • P below		p _i (kPa) =	3930		
4100 -	0.4	p _p (kPa) =	4138	p _F (kPa) =	4091
		$Q_{p}(m^{3}/s) =$	-	,	
8 4050 ·	• + 0.3 <u>F</u>	tp(s) =	-	t _F (s) =	1800
58 4000 -	n Rate n	S el S [*] (-)=	1.00E-06	S el S [*] (-)=	1.00E-06
Dow nhole	ु म + 02 दि	EC _w (mS/m)=		(/	
G 3950		Temp _w (gr C)=	13.0		
3900	•	Derivative fact.=	-	Derivative fact.=	-
3850 -	•				
	•••••••••••••••••••••••••••••••••••••••				
3800	0.80 1.20 1.40 1.80	Results		Results	•
Eisps	eo ime (nj	Q/s (m ² /s)=	NA		
Log-Log plot incl. derivates- fl	low period	Τ _M (m²/s)=	NA		
		Flow regime:	transient	Flow regime:	transient
		dt ₁ (min) =	-	dt ₁ (min) =	-
		dt ₂ (min) =	-	dt ₂ (min) =	-
		T (m²/s) =	NA	T (m²/s) =	NA
		S (-) =	NA	S (-) =	NA
		$K_s (m/s) =$	NA	$K_s (m/s) =$	NA
Not Ai	nalysed	$S_{s}(1/m) =$	NA	S _s (1/m) =	NA
		C (m ³ /Pa) =	NA	C (m³/Pa) =	NA
		C _D (-) =	NA	C _D (-) =	NA
		ξ(-) =	NA	ξ(-) =	NA
		$T_{GRF}(m^2/s) =$		$T_{GRF}(m^2/s) =$	
		$S_{GRF}(-) =$		S _{GRF} (-) =	
		$D_{GRF}(-) =$		D _{GRF} (-) =	
Log-Log plot incl. derivatives-	recovery period	Selected represe	entative param	ieters.	
		$ut_1 (min) =$	-	C (m)Pa) =	NA NA
		$u_{12}(mn) =$	- NA	$C_{\rm D}(-) =$	NA NA
		T _⊤ (m²/s) =		ξ(-) =	NA
Not Analysed		S(-) = K(m(a)) = -			
		$R_{s}(11/5) =$			
		Commente:	11/1		
		Based on the measu than 1E-10 m2/s. No further analysis	red test data, th	e interval transmiss	ivity is lower







Test Summary Sheet							
Project:	Oskarshamn site investiga	ation	Test type:[1]			Chir	
Area:	Laxe	mar	Test no:			1	
Borehole ID:	KL	X04	Test start:			040903 23.32	
Test section from - to (m):	415.51-420.5	i1 m	Responsible for test execution:			Jörg Böhner	
Section diameter, 2·r _w (m):	ction diameter, $2 \cdot r_w$ (m): 0.076		Responsible for		Crist	ian Enachescu	
Linear plot Q and p			Flow period		Recovery period		
			Indata		Indata		
4350	KLX04_415.51-420.51_040903_1_Chir_Q_r	.0	p₀ (kPa) =	4090	indutu		
4300 -	- 0.1	.9	p; (kPa) =	4088			
		.8	$p_{\rm p}({\rm kPa}) =$	4288	p _⊏ (kPa) =	4088	
4250 -	P section Pabove 0;	.7	$\rho_{\rm p}({\rm rr}^3/{\rm c}) =$	7.67E-06		4000	
e a		.6 E	$\frac{Q_p(\Pi / S)}{tn(S)} =$	1200	t _r (s) =	1200	
2 4200 - 18 2		ate [/mi	ερ (0) ερ (0)	1.00E-06	r (0) S d S [*] ()=	1.00E-06	
e. 90 91 4150 -		jection I	Sel S (-)- EC (mS/m)=	1.002 00	S el S (-)-	1.002.00	
		<u>A</u> =	$LC_w (IIIO/III) =$	13.3			
4100 -	- 0.3	.3	Derivativa fact -	0.11	Dorivativo fact -	0.05	
4050 -	- 01	2		0.11		0.03	
	••••••••••••••••••••••••••••••••••••••	.1					
4000 0.20 0.40 0.60 C	1.80 1.00 1.20 1.40 1.60 psed Time [h]	.0	Results		Results		
			Q/s (m²/s)=	3.8E-07			
Log-Log plot incl. derivates-	flow period		T _M (m²/s)=	3.1E-07			
			Flow regime:	transient	Flow regime:	transient	
Elapsed tir	ne[h]		dt ₁ (min) =	7.82	dt ₁ (min) =	3.17	
10 SKB Laxemar / KLX 04 415.51 - 420.51 / Chi	FlowDim Version 2.14b (c) Golder Associates	3	dt ₂ (min) =	12.97	dt ₂ (min) =	12.52	
•			T (m²/s) =	1.4E-06	T (m ² /s) =	2.4E-06	
		10 0	S (-) =	1.0E-06	S (-) =	1.0E-06	
10 0		0.3	K _s (m/s) =	2.8E-07	K _s (m/s) =	4.8E-07	
			S _s (1/m) =	2.0E-07	S _s (1/m) =	2.0E-07	
400 (1140)		10 ⁻¹ Ivim] Jb	C (m ³ /Pa) =	NA	C (m ³ /Pa) =	6.1E-10	
10 -1		1/q. (1	C _D (-) =	NA	$C_{D}(-) =$	6.7E-02	
		0.03	ξ(-) =	0.0	ξ(-) =	31.3	
		10 -2					
			$T_{GBF}(m^2/s) =$		$T_{GRF}(m^2/s) =$		
10 ³ 10 ⁴	10 ° 10 ° 10 ′ tD		$S_{GRF}(-) =$		$S_{GRF}(-) =$		
			$D_{GRF}(-) =$		$D_{GRF}(-) =$		
Log-Log plot incl. derivatives	- recovery period		Selected represe	ntative param	neters.		
			dt ₁ (min) =	3.17	C (m ³ /Pa) =	6.1E-10	
			dt ₂ (min) =	12.52	$C_{D}(-) =$	6.7E-02	
Elapsed tim	не[h]		$T_{T}(m^{2}/s) =$	2.4E-06	ξ(-) =	31.3	
10 SKB Laxemar / KLX 04 415.51 - 420.51 / Chir	FlowDim Version 2.14b (c) Golder Associates		S (-) =	1.0E-06	5.()		
i marine	•	10 2	$K_s (m/s) =$	4.8E-07			
10 ¹	ŧ		$S_{s}(1/m) =$	2.0E-07			
	:		Comments:				
10 10 10 10 10 10 10 10 10 10 10 10 10 1	: 	2 bb0/bb0/kbal	The recommended transmissivity of 2.4E-6 m2/s was derived from the analysis of the CHir phase, which shows the best data and derivative quality. It should be noted that due to the above mentioned			erived from the nd derivative ned	
10 *		10 -1	uncertainties regarding the flow dimension, the results are uncertain. The confidence range for the interval transmissivity is estimated to be 7.0E-7 to 5.0E-6 m2/s. The analysis was conducted using a flow			estimated to be ag a flow	
10, 10, 10, 10, 10, 10, 10, 10, 10, 10,	10 ⁻⁷ 10 ⁻⁴ 10 ⁻⁹		derived from the CI Horner plot to a val	Hir phase using sure of 4087.5 kP	measured at transdu straight line extrapo a.	ation in the	

Test Sum	Test Summary Sheet							
Project: Oskarshamn site investigation	Test type:[1]			Pi				
Area: Laxemai	Test no:			1				
Borehole ID: KLX04	Test start:			040904 06:01				
Test section from - to (m): 420.51-425.51 m	Responsible for test execution:			Jörg Böhner				
Section diameter, 2·r _w (m): 0.076	Responsible for		Cristi	an Enachescu				
Linear plot Q and p	test evaluation:		Recovery period					
	Flow period		Recovery period					
4350 KLX04_420.51-425.51_040904_1_Pi_O_r	p_0 (kPa) =	4139	indata					
	p; (kPa) =	4143						
4300 -	$p_{p}(kPa) =$	4343	p _∈ (kPa) =	4158				
 ✓ P section → U.15 ▲ P shove 42%n - 	$O_{(m^3/s)} =$	-	F1 ()					
	$\frac{d_p(m/s)}{tp(s)} =$	-	t _F (s) =	2100				
4200 0.10 Z	S el S [*] (-)=	1.00E-06	S el S [*] (-)=	1.00E-06				
	$EC_w (mS/m) =$							
a 4150	Temp _w (gr C)=	13.4						
0.05	Derivative fact.=	-	Derivative fact.=	0.09				
4100 -								
4050 L L L L L L L L L L L L L L L L L L	Results		Results					
Eispsed i me (n)	Q/s $(m^{2}/s)=$	NA						
Log-Log plot incl. derivates- flow period	$T_{M} (m^{2}/s) =$	NA						
	Flow regime:	transient	Flow regime:	transient				
	dt ₁ (min) =	-	dt ₁ (min) =	0.65				
	dt ₂ (min) =	-	dt ₂ (min) =	6.22				
	T (m²/s) =	NA	T (m²/s) =	7.9E-11				
	S (-) =	NA	S (-) =	1.0E-06				
	$K_{s}(m/s) =$	NA	$K_s (m/s) =$	1.6E-11				
Not Analysed	$S_{s}(1/m) =$	NA	S _s (1/m) =	2.0E-07				
	C (m³/Pa) =	NA	C (m³/Pa) =	6.3E-12				
	C _D (-) =	NA	C _D (-) =	6.9E-04				
	ξ(-) =	NA	ξ(-) =	3.7				
	$T_{CPF}(m^2/s) =$		$T_{CPF}(m^2/s) =$					
	$S_{GRF}(-) =$		$S_{GRF}(-) =$					
	D _{GRF} (-) =		D _{GRF} (-) =					
Log-Log plot incl. derivatives- recovery period	Selected represe	ntative param	neters.					
	dt ₁ (min) =	0.65	C (m³/Pa) =	6.3E-12				
Elapsed time [h]	dt ₂ (min) =	6.22	C _D (-) =	6.9E-04				
10 ¹ SKB Laomar / KLX 04 420.51 - 425.51 / Pl (c) Golder Associates (c) Golder Associates	$T_{T} (m^{2}/s) =$	7.9E-11	ξ(-) =	3.6				
10 ⁻¹	S (-) =	1.0E-06						
	K_{s} (m/s) =	1.6E-11						
10 003	$S_{s}(1/m) =$	2.0E-07						
diteman.	Comments:							
	The recommended transmissivity of 7.9E-11 m2/s was derived fi analysis of the CHir phase assuming a flow dimension of 2. Considering the inherent uncertainties related to the measurement							
10 ⁻¹								
specially the measurement of the wellbore storage coeffic				icient) and to				
	the analysis process	(e.g. numeric d	istortion when calcu	lating the				
10 ² 10 ³ 10 ⁴ 10 ⁵ 10 ⁶	derivative and press	sure history effective	cts), the confidence 1	ange for the				
	pressure could be de	erived.	-1110 JE-10 III2/S. N	NO SIAILO				

Test Summary Sheet							
Project:	Oskarshamn site investigation	Test type:[1]			Pi		
Area:	Laxemai	Test no:			1		
Borehole ID:	KLX04	Test start:			040904 07:55		
Test section from - to (m):	425.51-430.51 m	Responsible for			Jörg Böhner		
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for		Crist	ian Enachescu		
Lincer plot O and p		test evaluation:		Pasavan/ parias			
Linear plot & and p		riow periou		Recovery period			
4450 KLX04 425.51-430.51 040904 1 Pi O r	0.25	no (kPa) =	4188	illuata			
4400		p ₀ (kPa) =	4100				
	• P section	$p_1(kPa) =$	4192	n_(kPa)=	4196		
4350 -	P above P below	$p_p(\mathbf{x} \cdot \mathbf{a}) = 0$	-	p _F (Ki a) –	4170		
[e dot	- 0.15 g	$\frac{Q_p (\Pi / S)}{tp (S)} =$	-	t _⊏ (s) =	1800		
	Bate []mi	(°)	1 00E-06	ς d S [*] ()-	1.00E-06		
4250 ·	Liberton Liberton	EC _w (mS/m)=		0 ei 0 (-)-			
		Temp _w (gr C)=	13.5				
4200 -	₩	Derivative fact.=	-	Derivative fact.=	0.03		
4150 -	• ^{0.05}						
4100 0.20 0.40	0.00 0.80 1.00 1.20	Results		Results			
Elaps	d Time [h]	Q/s $(m^{2}/s)=$	NA				
Log-Log plot incl. derivates- f	ow period	$T_{M} (m^{2}/s) =$	NA				
		Flow regime:	transient	Flow regime:	transient		
		dt ₁ (min) =	-	dt ₁ (min) =	*		
		dt ₂ (min) =	-	dt ₂ (min) =	*		
		$T(m^{2}/s) =$	NA	T (m²/s) =	1.2E-11		
		S (-) =	NA	S (-) =	1.0E-06		
		$K_s (m/s) =$	NA	$K_s (m/s) =$	2.4E-12		
Not Ai	nalysed	$S_{s}(1/m) =$	NA	$S_{s}(1/m) =$	2.0E-07		
		C (m ³ /Pa) =	NA	$C(m^3/Pa) =$	7.9E-13		
		$C_D(-) =$	NA	$C_{D}(-) =$	8.7E-05		
		ξ(-) =	NA	ξ(-) =	2.6		
		$T_{aa}(m^{2}/s) =$		$T_{aaa}(m^2/s) =$			
		$S_{GRF}(-) =$		$S_{GRF}(-) =$			
		$D_{GRF}(-) =$		$D_{GRF}(-) =$			
Log-Log plot incl. derivatives-	recovery period	Selected represe	entative param	neters.			
		dt_1 (min) =	*	C (m ³ /Pa) =	7.9E-13		
Elapsed time (Ŋ.,	dt_2 (min) =	*	C _D (-) =	8.7E-05		
10 10 SKB Laxemar / KLX 04 425.51 - 430.51 / Pi		$T_{T} (m^{2}/s) =$	1.2E-11	ξ(-) =	2.6		
	(c) Column Associated	S (-) =	1.0E-06				
· · · · · · · · · · · · · · · · · · ·		$K_s (m/s) =$	2.4E-12				
10 0	0.03	S _s (1/m) =	2.0E-07				
	10 ⁻²	Comments:					
ŝ.		*: IARF not measured					
10 -1	0.003	The recommended transmissivity of 1.2E-11 m2/s was derived from the analysis of the PI phase assuming a flow dimension of 2 Considering			2 Considering		
	F 10 ⁻³	the inherent uncerta	inties related to	the measurement (e	.g. specially the		
		measurement of the	wellbore storag	e coefficient) and to	the analysis		
10 ¹ 10 ²	10 ⁻³ 10 ⁻⁴ 10 ⁻⁵ 3E-4	process (e.g. numer	ic distortion whe	en calculating the de	erivative and		
		estimated to be 8E-	12 to 7E-11 m2/	s. No static pressure	e could be		
		derived.		r			



	Test Summary Sheet							
Project:	Oskarshamn site investigation	Test type:[1]			Chir			
Area:	Laxemar	Test no:			1			
Borehole ID:	KLX04	Test start:			040904 12:31			
Test section from - to (m):	est section from - to (m): 435.50-440.50 m				Jörg Böhner			
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for		Crist	ian Enachescu			
Linear plot Q and p		Flow period		Recovery period				
p		Indata		Indata				
4500 KLX04_435.50-440.50_040904_1_CHir_C	P_r ● P section	p₀ (kPa) =	4289					
4450 -	▲ P above ● 9 ■ P below	p _i (kPa) =	-					
4400		p _p (kPa) =	-	p _F (kPa) =	-			
4400 -	•	$Q_{p} (m^{3}/s) =$	-					
(e gaj c	ja 0 +	tp(s) =	-	t _F (s) =	-			
80 4350 -	●	S el S [*] (-)=	1.00E-06	S el S [*] (-)=	1.00E-06			
		EC _w (mS/m)=		(/				
4300	•	Temp _w (gr C)=	13.6					
	••	Derivative fact.=	-	Derivative fact.=	-			
4250 -								
4200	0.50 0.60 0.70 0.80 0.90 1.00	Results		Results				
Elaps	ed lime [h]	Q/s (m²/s)=	NA					
Log-Log plot incl. derivates- fl	ow period	T _M (m²/s)=	NA					
		Flow regime:	transient	Flow regime:	transient			
		dt ₁ (min) =	-	dt ₁ (min) =	-			
		dt ₂ (min) =	-	dt ₂ (min) =	-			
		T (m²/s) =	NA	T (m ² /s) =	NA			
		S (-) =	NA	S (-) =	NA			
		K _s (m/s) =	NA	K _s (m/s) =	NA			
Not Ar	nalysed	S _s (1/m) =	NA	S _s (1/m) =	NA			
		C (m³/Pa) =	NA	C (m³/Pa) =	NA			
		C _D (-) =	NA	C _D (-) =	NA			
		ξ(-) =	NA	ξ(-) =	NA			
		T _{GRF} (m²/s) =		T _{GRF} (m ² /s) =				
		S _{GRF} (-) =		S _{GRF} (-) =				
		D _{GRF} (-) =		D _{GRF} (-) =				
Log-Log plot incl. derivatives-	recovery period	Selected represe	ntative paran	neters.				
		dt_1 (min) =	-	C (m ³ /Pa) =	NA			
		dt ₂ (min) =	-	C _D (-) =	NA			
		$T_{T} (m^{2}/s) =$	NA	ξ(-) =	NA			
		S (-) =	NA					
Not Analysed		K _s (m/s) =	NA					
		S _s (1/m) =	NA					
		Comments:						
		Based on the test re	sponse (prolong	ed packer complian	ce) the interval			
		transmissivity is lov No further analysis	ver than 1E-11 r recommended	m2/s.				
		. to receiver unaryold						



	Test Sum	narv Sheet			
Project:	Oskarshamn site investigation	Test type:[1]			Pi
Area:	Laxemar	Test no:			1
Borehole ID:	KLX04	Test start:			040904 15:38
Test section from - to (m):	445.50-450.50 m	Responsible for test execution:			Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for		Cristi	an Enachescu
Linear plot Q and p		Flow period		Recovery period	
		Indata		Indata	
4650	0.20 KLX04_445.50-450.50_040904_1_Pi_Q_r	p₀ (kPa) =	4389		
4600 -	- 0.18	p _i (kPa) =	4404		
	0.16	$p_{\rm p}(kPa) =$	4607	p _F (kPa) =	4504
4550 - P section ▲ P above	0.14	Ω_{r} (m ³ /s)=	-	, ,	
	• 0.12 ਵ	$\frac{dp}{dp}$ (m / c) =	-	t _F (s) =	2400
e 4000	• <u>-</u> 0.10 2	S el S [*] (-)=	1.00E-06	S el S [*] (-)=	1.00E-06
90 4450 -		$EC_w (mS/m) =$			
		Temp _w (ar C)=	13.8		
4400	0.06	Derivative fact.=	-	Derivative fact.=	0.07
4350 -	• 0.04				
	- 0.02				
4300 0.20 0.40 0.60 0.80	1.00 1.20 1.40 1.60 1.80 2.00	Results		Results	
Elap	ed Time [h]	Q/s $(m^{2}/s)=$	NA		
Log-Log plot incl. derivates- f	low period	T_{M} (m ² /s)=	NA		
		Flow regime:	transient	Flow regime:	transient
		dt_1 (min) =	-	dt ₁ (min) =	23.78
		dt_2 (min) =	-	dt ₂ (min) =	36.53
		$T(m^{2}/s) =$	NA	T (m²/s) =	8.4E-12
		S (-) =	NA	S (-) =	1.0E-06
		$K_s (m/s) =$	NA	K _s (m/s) =	1.7E-12
Not A	nalysed	S _s (1/m) =	NA	S _s (1/m) =	2.0E-07
	2	C (m ³ /Pa) =	NA	C (m ³ /Pa) =	8.9E-12
		C _D (-) =	NA	C _D (-) =	9.8E-04
		ξ(-) =	NA	ξ(-) =	1.0
		$T_{GRF}(m^2/s) =$		T _{GRF} (m ² /s) =	
		S _{GRF} (-) =		S _{GRF} (-) =	
		D _{GRF} (-) =		D _{GRF} (-) =	
Log-Log plot incl. derivatives	recovery period	Selected represe	entative param	neters.	
		dt_1 (min) =	23.78	C (m³/Pa) =	8.9E-12
Elapsed time	[h] 10, ⁻¹ 10, ⁰ 1	dt_2 (min) =	36.53	C _D (-) =	9.8E-04
SKB Laxemar / KLX 04 445.50 - 450.50 / Pi	FlowDim Version 2.14b (c) Golder Associates 3	$T_{T} (m^{2}/s) =$	8.4E-12	ξ(-) =	1.0
	tu [°]	S (-) =	1.0E-06		
	Martin Martin Contraction of the	$K_s (m/s) =$	1.7E-12		
10 10 10 10 10 10 10 10 10 10 10 10 10 1	03 O	S _s (1/m) =	2.0E-07		
	and pe	Comments:			
	- 10 ° sp	The recommended	transmissivity of	f 8.4E-12 m2/s was o	lerived from the
10 -1	0.03	analysis of the PI pl the inherent uncerts	uase assuming a inties related to	the measurement (e	g, specially the
		measurement of the	wellbore storag	ge coefficient) and to	the analysis
	10 -2	process (e.g. numer	ic distortion whe	en calculating the de	rivative and
10 -1 10 0	10 ⁻¹ 10 ⁻² 10 ⁻³	pressure history eff	ects), the confide	ence range for the tra	ansmissivity is
		estimated to be 1E- derived	12 to 1E-11 m2/	s. No static pressure	could be
		averred.			



Test Summary Sheet							
Project:	Oskarshamn site investigation	Test type:[1]			Pi		
Area:	Laxemar	Test no:			1		
Borehole ID:	KLX04	Test start:	040904 2				
Test section from - to (m):	455.50-460.50	Responsible for			Jörg Böhner		
Soction diamotor 2.r (m):	0.076	test execution:		Criet	ian Engebosou		
Section diameter, 2^{-1} w (iii).	0.070	test evaluation:		Clistian Enachesco			
Linear plot Q and p		Flow period		Recovery period]		
4750	0.50	Indata	-	Indata			
KLX04_455.50-460.50_040904_1_Pi_Q_r	P section 0.45	p ₀ (kPa) =	4485				
4700 •	P above P below P 0.40	p _i (kPa) =	4497				
4650 -		p _p (kPa) =	4699	p _F (kPa) =	4582		
-		$Q_p (m^3/s) =$	-	(()	2 (0 0		
4600 ·		tp (s) =	-	$t_F(s) =$	3600		
9 9 4 4550 -	- 0.25 & 5 5 5	SelS (-)=	1.00E-06	S el S (-)=	1.00E-06		
	0.20 ^g	$EC_w (IIIS/III) =$	13.0				
4500	0.15	Derivative fact =	-	Derivative fact =	0.09		
4450 -	0.10		-		0.09		
4400		De sulte		Desults			
0.00 0.50 1.00 1.50 2.00 2.50 Elapsed Time [h]			ΝΑ	Results			
Log Log plot incl. derivates, fl	ow period	Q/s (m/s) =					
Log-Log plot men derivates- m		T _M (m /s)=	transient	Flow regime.	transient		
		dt_1 (min) =	-	dt_1 (min) =	16.12		
		dt_2 (min) =	-	dt_2 (min) =	26.78		
		$T(m^2/s) =$	NA	$T(m^2/s) =$	1.3E-10		
		S (-) =	NA	S (-) =	1.0E-06		
		$K_s (m/s) =$	NA	$K_s (m/s) =$	2.6E-11		
Not Ar	alysed	S _s (1/m) =	NA	S _s (1/m) =	2.0E-07		
	-	C (m³/Pa) =	NA	C (m³/Pa) =	4.9E-11		
		C _D (-) =	NA	C _D (-) =	5.4E-03		
		ξ(-) =	NA	ξ(-) =	1.1		
		$T_{GRF}(m^2/s) =$		$T_{GRF}(m^2/s) =$			
		$S_{GRF}(-) =$		$S_{GRF}(-) =$			
Log Log plot incl. dorivativos	rocovery period	$D_{\text{GRF}}(-) =$	ntativo noran	$D_{\text{GRF}}(-) =$			
Log-Log plot met. derivatives-	recovery period	dt. (min) =	16 12	$C \left(m^{3} / D_{2} \right) =$	4 9E-11		
		dt_2 (min) =	26.78	$C(m/Pa) = C_{D}(-) =$	5.4E-03		
Elapsed time (r	J	$T_{\pm}(m^2/s) =$	1.3E-10	ε (-) =	1.1		
10 SKB Laxemar / KLX 04 455.50 - 460.50 / Pi	FlowDim Version 2.14b (c) Golder Associates	S (-) =	1.0E-06	5 ()			
	www.	K _s (m/s) =	2.6E-11				
· · · · ·	0.3	S _s (1/m) =	2.0E-07				
	10 ⁻¹	Comments:					
	- The second sec	The recommended transmissivity of 1.3E-10 m2/s was derived from the			derived from the		
•	0.03	analysis of the Pi phase. It should be noted that due to the very low interval transmissivity the results are very uncertain. Considering the					
10	10 -2	interval transmissivity the results are very uncertain. Considering the inherent uncertainties related to the measurement (e.g. specially the measurement of the wellbore storage coefficient) and to the analysis					
					the analysis		
	0.003	process (e.g. numer	ic distortion whe	en calculating the de	erivative and		
10 [°] 10 ¹ 10	10 ⁴ 10 ² 10 ⁴	estimated to be 3E-	11 to 3E-10 m2/	s. The analysis was	conducted		
		using a flow dimen	sion of 2. No sta	tic pressure could b	e derived.		




	Test Summary Sheet						
Project:	Oskarshamn site investigation	Test type:[1]			Chir		
Area:	Laxemar	Test no:			1		
Borehole ID:	KLX04	Test start:		040905 05:			
Test section from - to (m):	470.52-475.52 m	Responsible for test execution:		Jörg Böhn			
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:		Crist	ian Enachescu		
Linear plot Q and p		Flow period		Recovery period			
	* 1 0	Indata		Indata			
4690 . KLX04_470.52-475.52_040905_1_Chir_Q_r	•	p ₀ (kPa) =	4634				
	- 0.9	p _i (kPa) =	-				
		p _p (kPa) =	-	p _F (kPa) =	-		
4650 -	0.7	Q _p (m ³ /s)=	-				
	● - ⁰⁰ -	tp (s) =	-	t _F (s) =	-		
8 4630 - 8 8 4	P section	S el S [*] (-)=	1.00E-06	S el S [*] (-)=	1.00E-06		
	P below	EC _w (mS/m)=					
_	- 0.3	Temp _w (gr C)=	14.2				
4590 -		Derivative fact.=	-	Derivative fact.=	-		
4570							
	• 0.1						
4550 0.20 0.40	0.0 0.80 1.00	Results		Results			
Eiapse	a iime (n)	Q/s (m ² /s)=	NA				
Log-Log plot incl. derivates- fl	ow period	$T_{M} (m^{2}/s) =$	NA				
		Flow regime:	transient	Flow regime:	transient		
		dt ₁ (min) =	-	dt ₁ (min) =	-		
		dt ₂ (min) =	-	dt ₂ (min) =	-		
		T (m²/s) =	NA	T (m²/s) =	NA		
		S (-) =	NA	S (-) =	NA		
		$K_{s} (m/s) =$	NA	$K_{s} (m/s) =$	NA		
Not Ar	alysed	S _s (1/m) =	NA	S _s (1/m) =	NA		
	-	C (m³/Pa) =	NA	C (m³/Pa) =	NA		
		C _D (-) =	NA	C _D (-) =	NA		
		ξ(-) =	NA	ξ(-) =	NA		
		$T_{GRF}(m^2/s) =$		$T_{GRF}(m^2/s) =$			
		S _{GRF} (-) =		S _{GRF} (-) =			
		D _{GRF} (-) =		D _{GRF} (-) =			
Log-Log plot incl. derivatives-	recovery period	Selected represe	ntative paran	neters.			
		$dt_1 (min) =$	-	C (m ³ /Pa) =	NA		
		dt_2 (min) =	-	C _D (-) =	NA		
		T⊤ (m²/s) =	NA	ξ(-) =	NA		
		S (-) =	NA				
		$K_s (m/s) =$	NA				
Not Ar	alysed	S _s (1/m) =	NA				
		Comments: Based on the test re transmissivity is low No further analysis	sponse (prolong ver than 1E-11 r recommended.	ed packer complian n2/s.	ce) the interval		

Test Summary Sheet						
Project:	Oskarshamn site investigation	Test type:[1]			Chir	
Area:	Laxemar	Test no:			1	
Borehole ID:	KLX04	Test start:		040905 07:2		
Test section from - to (m):	475.52-480.52 m	Responsible for test execution:			Jörg Böhner	
Section diameter, 2·r _w (m):	0.076	Responsible for		Crist	ian Enachescu	
Linear plot Q and p		Flow period		Recovery period		
		Indata		Indata		
4800 KLX04_475.52-480.52_040905_1_Chir_Q_t	r P section	p₀ (kPa) =	4683			
4780 -	P above 9 P below	p _i (kPa) =	-			
4760 -		p _p (kPa) =	-	p _F (kPa) =	-	
4740 -	7	$Q_{p}(m^{3}/s) =$	-	,		
ي ق 4720		tp(s) =	-	t _F (s) =	-	
99 4700 -	- 5 B2	S el S [*] (-)=	1.00E-06	S el S [*] (-)=	1.00E-06	
eyoru 4680	4 Injection	EC _w (mS/m)=				
•	•	Temp _w (gr C)=	14.2			
4000 -	•	Derivative fact.=	-	Derivative fact.=	-	
4640	+ 2					
4620	1					
4600 0.20 0.40	0.60 0.80 1.00	Results		Results		
Elaps	ed Time [h]	$\Omega/s (m^2/s) =$	NA			
Log-Log plot incl. derivates- fl	ow period	$T_{\rm rec} (m^2/s) =$	NA			
	••••	Flow regime:	transient	Flow regime:	transient	
		dt₁ (min) =	-	dt₁ (min) =	-	
		dt_2 (min) =	-	dt_2 (min) =	-	
		$T(m^2/s) =$	NA	$T(m^2/s) =$	NA	
		S (-) =	NA	S (-) =	NA	
		$K_s(m/s) =$	NA	$K_s(m/s) =$	NA	
Not Ar	nalvsed	$S_{s}(1/m) =$	NA	$S_{s}(1/m) =$	NA	
	iul y sou	$C (m^{3}/Pa) =$	NA	$C_{(m^{3}/Pa)} =$	NA	
		$C_{\rm D}(-) =$	NA	$C_{D}(-) =$	NA	
		٤ (-) =	NA	ξ(-) =	NA	
		5()		5.()		
		$T_{CDF}(m^2/s) =$		$T_{CDF}(m^2/s) =$		
		$S_{GRF}(-) =$		$S_{GRF}(-) =$		
		$D_{GRF}(-) =$		$D_{GRF}(-) =$		
Log-Log plot incl. derivatives-	recovery period	Selected represe	ntative param	neters.		
		dt_1 (min) =	-	C (m ³ /Pa) =	NA	
		dt_2 (min) =	-	$C_{D}(-) =$	NA	
		$T_{T}(m^{2}/s) =$	NA	ξ(-) =	NA	
		S (-) =	NA	- • •		
		K _s (m/s) =	NA			
Not Analysed		S _s (1/m) =	NA			
	J	Comments:			•	
		Based on the test re	sponse (prolong	ed packer complian	ce) the interval	
		transmissivity is low	ver than 1E-11 r	m2/s.		
		No further analysis	recommended.			

Test Summary Sheet						
Project:	Oskarshamn site investigation	Test type:[1]			Chir	
Area:	Laxemar	Test no:			1	
Borehole ID:	KLX04	Test start:			040905 08:57	
Test section from - to (m):	480.52-485.52 m	Responsible for test execution:			Jörg Böhner	
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for		Crist	ian Enachescu	
Linear plot Q and p		Flow period		Recovery period		
		Indata		Indata		
5000 KLX04_480.52-485.52_040905_1_Chir_Q_r	0.10	p ₀ (kPa) =	4732			
4950 -		p _i (kPa) =	4726		1	
	0.08	$p_p(kPa) =$	4943	p _F (kPa) =	4727	
4900 · P section		Q_{n} (m ³ /s)=	8.50E-07		ti	
■ P below	0.06 g	tp(s) =	1200	t _F (s) =	300	
Pros sur	gete live	S el S [*] (-)=	1.00E-06	S el S [*] (-)=	1.00E-06	
400 - 48000 - 48000 - 4800 - 4800 - 4800 - 4800 - 4800 - 4800 - 4800 - 4	9 9 9.0.04	$EC_w (mS/m) =$				
		Temp _w (gr C)=	14.3			
4750 -		Derivative fact.=	0.19	Derivative fact.=	0.02	
4700 -	•					
4650	0.60 0.80 1.00	Results		Results		
Elaps	d Time [h]	$Q/s (m^2/s) =$	3.8E-08			
Log-Log plot incl. derivates- fl	ow period	T_{M} (m ² /s)=	3.2E-08		<u> </u>	
		Flow regime:	transient	Flow regime:	transient	
Elaosed time	Ini	dt_1 (min) =	0.49	dt_1 (min) =	0.72	
10 ⁻⁴ 10 ⁻³ SKB Laxemar / KLX 04 SKB Laxemar / KLX 04	10 ⁻² 10 ⁻¹ 10 ⁰ FlowDim Version 2.14b	dt_2 (min) =	1.72	dt_2 (min) =	2.04	
	(c) Golder Associates	$T(m^2/s) =$	1.1E-07	$T(m^{2}/s) =$	1.8E-07	
10 2	10 ²	S (-) =	1.0E-06	S (-) =	1.0E-06	
		K _s (m/s) =	2.2E-08	$K_s (m/s) =$	3.5E-08	
10 ¹	10 1	S _s (1/m) =	2.0E-07	S _s (1/m) =	2.0E-07	
440. (TheD)	brund Jb	C (m ³ /Pa) =	NA	C (m ³ /Pa) =	1.3E-11	
10 [°]	10° UP	C _D (-) =	NA	C _D (-) =	1.4E-03	
	tan -1	ξ(-) =	10.6	ξ(-) =	21.7	
10	10					
10,11,10,12	10 ¹³ 10 ¹⁴ 10 ¹⁵	T _{GRF} (m ² /s) =		T _{GRF} (m ² /s) =		
	,	S _{GRF} (-) =		S _{GRF} (-) =		
		D _{GRF} (-) =		D _{GRF} (-) =		
Log-Log plot incl. derivatives-	recovery period	Selected represe	entative paran	neters.		
		$dt_1 (min) =$	0.49	C (m³/Pa) =	1.3E-11	
Elapsed time [h]		dt_2 (min) =	1.72	$C_D(-) =$	1.4E-03	
SKB Laxemar / KLX 04 480.52 - 485.52 / Chir	FlowDim Version 2:14b (c) Golder Associates	$T_{T} (m^{2}/s) =$	1.1E-07	ξ(-) =	10.6	
	•••••	S (-) =	1.0E-06			
10 ¹	10 2	$K_s (m/s) =$	2.2E-08			
		$S_s(1/m) =$	2.0E-07			
	30 Real	Comments:	. .			
то ^о .		analysis of the CHi quality. The confide estimated to be 7.01 during the test is 2.	transmissivity of phase, which sh ence range for th E-8 to 4.0E-7 m ² . The static press	ows the best data an e interval transmiss 2/s. The flow dimen- ure measured at trans	ivity is sion displayed	
10 ¹ 10 ¹ 10 ¹	¹ to ²	was derived from the Horner plot to a val	ne CHir phase us lue of 4726.6 kP	sing straight line ext a.	rapolation in the	

Test Summary Sheet							
Project:	Oskarshamn site investigation	Test type:[1]		Chir			
Area:	Laxemar	Test no:			1		
Borehole ID:	KLX04	Test start:		040905 10:3			
Test section from - to (m):	505.55-510.55	Responsible for		Jörg Böhner			
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for		Crist	ian Enachescu		
Linear plot Q and p		Flow period		Recovery period			
		Indata		Indata			
5040 KLX04_505.55-510.55_040905_1_Chir_C	a_r	p ₀ (kPa) =	4977		1		
		p _i (kPa) =	-				
5020	0.08	$p_{p}(kPa) =$	-	p _F (kPa) =	-		
5000		$O_{(m^3/s)} =$	-				
[baa]		$d_p (m/3)^{-}$	-	t _F (s) =	-		
4980 4 980	La la la la la la la la la la la la la la	S el S [*] (_)=	1.00E-06	S el S [*] (_)=	1.00E-06		
P P	P section P above Pabove	5 er 5 (-)- FC (mS/m)=	1.001 00	3 el 3 (- <i>)</i> -	1.002.00		
§ 4960 -	Q P below 0.04 -	$Temp_{u}(ar C) =$	14 7				
4940 -	•	Derivative fact =	-	Derivative fact =	-		
	- 0.02						
4920	•						
4900	0.80 1.00 1.20 1.40 1.60	Results		Results			
Elapse	ed Time [h]	$O(a_1(m^2/a))$	NA	Results	1		
l og l og plot incl. derivates, fl	ow period	Q/S (ff1/S)=					
Log-Log plot men derivates- n		T _M (m /s)=	transient	Flow regime:	transiont		
		riow regime.	transient	riow regime.	liansieni		
		$dt_1(min) =$	-	dt_1 (min) =	-		
		$d_{12}(11111) =$	-	$dt_2(fff) = -$	- NIA		
		I (m ⁻ /s) =		I (m ⁻ /s) =			
		S(-) = K(m(a)) =		S(-) = K(m(a)) =			
Not Ar	a alaya a d	$R_{s}(11/s) =$		$R_{s}(11/s) =$			
Not Al	lafyseu	$S_{s}(1/11) =$		$S_{s}(1/11) =$			
		C (m ² /Pa) =		C (m ⁷ /Pa) =			
		$C_{\rm D}(-) =$		$C_{\rm D}(-) =$			
		ς(-) =	NA .	ς(-) =	INA		
		$T_{CPF}(m^2/s) =$		$T_{CPF}(m^2/s) =$			
		$S_{GRF}(-) =$		$S_{GRF}(-) =$			
		$D_{GRF}(-) =$		$D_{GRF}(-) =$			
Log-Log plot incl. derivatives-	recovery period	Selected represe	ntative paran	neters.			
	•••	dt_1 (min) =	-	$C (m^3/Pa) =$	NA		
		dt_2 (min) =	-	$C_{D}(-) =$	NA		
		$T_{T}(m^2/s) =$	NA	٤ (-) =	NA		
		S (-) =	NA				
		K _s (m/s) =	NA				
Not Analysed		$S_{s}(1/m) =$	NA				
110171	141 3 000	Comments:					
		Based on the test re transmissivity is lov No further analysis	sponse (prolong ver than 1E-11 r recommended.	ed packer complian n2/s.	ce) the interval		

	Test Sumr	narv Sheet			
Project:	Oskarshamn site investigation	Test type:[1]			Chir
Area:	Laxemar	Test no:			1
Borehole ID:	KLX04	Test start:			040905 12:46
Test section from - to (m):	510.56-515.56 m	Responsible for	Jörg Böl		
Section diameter, 2·r _w (m):	0.076	Responsible for		Crist	ian Enachescu
		test evaluation:			
Linear plot Q and p		Flow period		Recovery period	l
5250	T 3.0	Indata		Indata	
KLX04_510.56-515.56_040905_1_Chir_Q_r	••••••	p ₀ (kPa) =	5029		
5200 -	- 2.5	p _i (kPa) =	5025		
Beaction		p _p (kPa) =	5226	p _F (kPa) =	5026
5150 ₽ below	• 2.0	$Q_{p} (m^{3}/s) =$	2.66E-05		
	The second secon	tp(s) =	1200	t _F (s) =	600
5100 -	99 15 82	S el S [*] (-)=	1.00E-06	S el S [*] (-)=	1.00E-06
w nhole	hje ction	EC_{w} (mS/m)=			
8 5050	1.0	$Temp_{u}(ar C) =$	14.8		
		Derivative fact =	0.07	Derivative fact =	0.06
5000 -	- 0.5		0.07		0.00
4950		D 11		D #	
0.00 0.20 0.40 Elap:	0.60 0.80 1.00 1.20 sed Time [h]	Results		Results	
		Q/s (m²/s)=	1.3E-06		
Log-Log plot incl. derivates- f	low period	T _M (m²/s)=	1.1E-06		
		Flow regime:	transient	Flow regime:	transient
10,-3 10,-2 Elapsed time	[h] 10 ⁻¹	$dt_1 (min) =$	0.48	dt ₁ (min) =	0.19
10 ¹ SKB Laxemar / KLX 04 510.56 - 515.56 / Chi	FlowDim Version 2.14b (c) Golder Associates	dt ₂ (min) =	1.28	dt ₂ (min) =	1.24
• • • • • • • • • • • • • • • • • • •		$T(m^{2}/s) =$	1.2E-06	T (m²/s) =	2.4E-06
		S (-) =	1.0E-06	S (-) =	1.0E-06
10 "	10 -1	$K_s (m/s) =$	2.4E-07	K_{s} (m/s) =	4.8E-07
		$S_{s}(1/m) =$	2.0E-07	S _s (1/m) =	2.0E-07
Seri) Celu	0.03	C (m ³ /Pa) =	NA	C (m ³ /Pa) =	1.6E-10
10 -1		$C_{D}(-) =$	NA	$C_{D}(-) =$	1.8E-02
		ξ(-) =	-0.6	ξ(-) =	4.3
	0.003	5 ()			
		$T_{opr}(m^2/s) =$		$T_{opc}(m^2/s) =$	
10 ⁻³ 10 ⁻⁴	10 ⁵ 10 ⁶ 10 ⁷ 10	$S_{GRF}(-) =$		$S_{GRF}(-) =$	
		$D_{GRF}(-) =$		$D_{GRE}(-) =$	
Log-Log plot incl. derivatives	recovery period	Selected represe	entative paran	eters.	
		dt₁(min) =	0.19	$C (m^{3}/P_{2}) =$	1.6E-10
Elapsed tim	s (h)	dt_2 (min) =	1 24	$C(m/n a) = C_{D}(-) =$	1.8E-02
10 ² SKB Laxemar / KLX 04	10, ⁻²	$T_{1}(m^{2}(a)) =$	2 4F-06	ε (_) =	4.3
31030-31330/Cill	(c) Golder Associates 10 ²	$S_{(-)} =$	1.9E-06	ς (-)	4.0
· · · · · · · · · · · · · · · · · · ·		S(-) = -	1.0E-00		
10	10 ²	$R_{s}(11/s) =$	4.8E-07		
		$S_{s}(1/m) =$	2.0E-07		
	1000	Comments:			
	10 ¹ ¹ ¹ ¹ ¹ ¹ ¹	The recommended	transmissivity of	f 2.4E-6 m2/s was de	erived from the
		quality The confide	ence range for the	nows me best data a	ivity is
10	10 °	estimated to be 9.01	E-7 to 5.0E-6 m	2/s. The flow dimens	sion displayed
		during the test is 2.	The static press	ure measured at tran	sducer depth,
10 ⁻¹ 10 ⁻²	10 ⁻³ 10 ⁻⁴ 10 ⁻⁵	was derived from th	ne CHir phase us	sing straight line extra	rapolation in the
tD		Horner plot to a val	ue of 5026.6 kP	a.	



	Test Sumr	narv Sheet			
Project:	Oskarshamn site investigation	Test type:[1]			Chir
Area:	Laxemar	Test no:			1
Borehole ID:	KLX04	Test start:			040905 16:01
Test section from - to (m):	520.57-525.57 m	Responsible for			Jörg Böhner
Section diameter 2.r., (m):	0.076	test execution:		Crist	ian Enachescu
	0.010	test evaluation:		Chot	
Linear plot Q and p		Flow period		Recovery period	
5400	0.8	Indata		Indata	
KLX04_520.57-525.57_040905_1_Chir_Q_r	F	p ₀ (kPa) =	5128		
5350 -	- 0.7	p _i (kPa) =	5124		
5300 -	- 0.6	p _p (kPa) =	5325	p _F (kPa) =	5124
P section P above		Q _p (m ³ /s)=	5.55E-06		
P below		tp (s) =	1200	t _F (s) =	600
ड 8 8 8 8 8	0.4 B	S el S [*] (-)=	1.00E-06	S el S [*] (-)=	1.00E-06
0 5150		EC _w (mS/m)=			
	-	Temp _w (gr C)=	15.0		
5100 -	02	Derivative fact.=	0.11	Derivative fact.=	0.02
5050 -	- 0.1				
5000 Carlos Contra de 	0.80 1.00 1.20 1.40 ed Time [h]	Results		Results	
		Q/s (m ² /s)=	2.7E-07		
Log-Log plot incl. derivates- fl	ow period	T _M (m ² /s)=	2.2E-07		
		Flow regime:	transient	Flow regime:	transient
Elapsed lime	[n]	dt ₁ (min) =	0.56	dt ₁ (min) =	0.30
10 10 SKB Laxemar / KLX 04		$dt_2 (min) =$	1.24	dt ₂ (min) =	4.50
52057 - 525.57 / Chi	FlowDim Version 2.14b (c) Golder Associates	$T(m^{2}/s) =$	2.7E-07	T (m²/s) =	1.3E-06
	10 °	S (-) =	1.0E-06	S (-) =	1.0E-06
10 °		$K_s (m/s) =$	5.4E-08	K _s (m/s) =	2.5E-07
A Start A	0.3	S _s (1/m) =	2.0E-07	S _s (1/m) =	2.0E-07
	10 ⁻¹	C (m ³ /Pa) =	NA	C (m ³ /Pa) =	3.3E-11
≃	* * **********************************	C _D (-) =	NA	C _D (-) =	3.6E-03
	0.03	ξ(-) =	0.0	ξ(-) =	21.2
	10	$T_{GRE}(m^2/s) =$		$T_{GRE}(m^2/s) =$	
10 ³ 10 ⁴ 1	10 ^{°[°] 10[°] 10[°]}	$S_{GRF}(-) =$		$S_{GRF}(-) =$	
		D _{GRF} (-) =		D _{GRF} (-) =	
Log-Log plot incl. derivatives-	recovery period	Selected represe	entative paran	neters.	
		dt_1 (min) =	0.56	C (m ³ /Pa) =	3.3E-11
Elapsed time	h] 	dt_2 (min) =	1.24	$C_{D}(-) =$	3.6E-03
10 ² SKB Laxemar / KLX 04 520.57 - 525.57 / Chir	FlowDim Version 2.14b (c) Golder Associates	T_{T} (m ² /s) =	2.7E-07	ξ(-) =	0.0
		S (-) =	1.0E-06	,	
10 1	to ²	$K_s(m/s) =$	5.4E-08		
		$S_{s}(1/m) =$	2.0E-07		
	10 ¹	Comments:			<u>.</u>
10 ⁻¹		The recommended the analysis of the CHi quality. The confidered estimated to be 9.01 during the test is 2. was derived from the the test is 2.	transmissivity of phase, which sh ence range for th E-8 to 5.0E-7 m ² The static press he CHir phase us	f 2.7E-7 m2/s was do ows the best data an he interval transmiss 2/s. The flow dimen- ure measured at tran sing straight line extra	erived from the d derivative ivity is sion displayed isducer depth, rapolation in the
		estimated to be 9.01 during the test is 2. was derived from the Horner plot to a val	E-8 to 5.0E-7 m ² The static press the CHir phase us ue of 5125.2 kP	2/s. The flow dimension of the straight line extra a.	sion displaye sducer depth rapolation in

Test Summary Sheet						
Project:	Oskarshamn site investigation	Test type:[1]	CI			
Area:	Laxemar	Test no:			1	
Borehole ID:	KLX04	Test start:		040905 18		
Test section from - to (m):	545.62-550.62 m	Responsible for test execution:			Jörg Böhner	
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for		Crist	ian Enachescu	
Linear plot Q and p		flow period		Recovery period		
P P P		Indata		Indata		
KLX04_545.62-550.62_040905_1_Chir_Q_	r	p₀ (kPa) =	5372			
5550 -		p _i (kPa) =	-			
5500 - P section	*	p _p (kPa) =	-	p _F (kPa) =	-	
P above P below	•	$Q_{p}(m^{3}/s) =$	-			
₹ 5450U	~ ³ ਵ	tp(s) =	-	t _F (s) =	-	
§ 5400 -		S el S [*] (-)=	1.00E-06	S el S [*] (-)=	1.00E-06	
Powmhole Pow		EC _w (mS/m)=				
5350	•	Temp _w (ar C)=	15.4			
5300 -	•	Derivative fact.=	-	Derivative fact.=	-	
5250 -	•					
	•					
5200 0.40	0.60 0.80 1.00 1.20	Results		Results		
Elaş	psed Time [h]	Ω/s (m ² /s)=	NA			
l og-l og plot incl. derivates- f	low period	$T_{m}(m^{2}/c) =$	NA			
Log-Log plot incl. derivates- now period		Flow regime:	transient	Flow regime:	transient	
		dt_1 (min) =	-	dt_1 (min) =	-	
		dt_{1} (min) =	-	dt_{1} (min) =	-	
		$T_{m}^{2}(n) =$	NA	$T_{m}(m^{2}/c) =$	NA	
		S(-) =	NA	S(-) =	NA	
		$K_{a}(m/s) =$	NA	$K_{a}(m/s) =$	NA	
Not A	nalvsed	$S_{c}(1/m) =$	NA	$S_{c}(1/m) =$	NA	
	narysed	$C_{\rm m}^{3}/P_{\rm m}$	NA	$C_{\rm m}^{3}/P_{\rm m}$	NA	
		$C_{n}(-) =$	NA	$C_{n}(-) =$	NA	
		ε _B () =	NA	ε ₀ () =	NA	
		()		()		
		$T_{ops}(m^2/s) =$		$T_{ops}(m^2/s) =$		
		S _{GRF} (-) =		$S_{GRF}(-) =$		
		$D_{GRF}(-) =$		$D_{GRF}(-) =$		
Log-Log plot incl. derivatives-	- recovery period	Selected represe	entative paran	neters.		
	- ·	dt_1 (min) =	-	$C (m^3/Pa) =$	NA	
		dt_2 (min) =	-	$C_{D}(-) =$	NA	
		$T_{T}(m^2/s) =$	NA	ξ(-) =	NA	
		S (-) =	NA	- ` ′		
		$K_s(m/s) =$	NA			
Not Analysed		$S_{s}(1/m) =$	NA			
		Comments:			•	
		Based on the test re transmissivity is low No further analysis	sponse (prolong ver than 1E-11 r recommended.	ed packer complian n2/s.	ce) the interval	







	Test Sum	mary Sheet			
Project:	Oskarshamn site investigation	Test type:[1]			Chir
Area:	Laxema	r Test no:			1
Borehole ID:	KLX04	1 Test start:	040906 06		
Test section from - to (m):	565.64-570.64 n	Responsible for			Jörg Böhner
Section diameter, 2·r _w (m):	0.076	Responsible for		Crist	ian Enachescu
		test evaluation:			
Linear plot Q and p		Flow period		Recovery period	
5800	0.5	Indata		Indata	
KLX04_565.64-570.64_040906_1_Chir_Q_r		p ₀ (kPa) =	5565		
5750 ·		p _i (kPa) =	5559		
	- 0.4	p _p (kPa) =	5772	p _F (kPa) =	5560
5700 - 🗣 9 section		$Q_{p} (m^{3}/s) =$	4.62E-06		
Pabove	0.3 E	tp(s) =	1200	t _F (s) =	300
90 5650 -	Rate Dr	S el S [*] (-)=	1.00E-06	S el S [*] (-)=	1.00E-06
w nhole	upe ction	EC_{w} (mS/m)=			
8 5600		Temp(gr C)=	15.7		
		Derivative fact =	0.04	Derivative fact =	0.01
5550 -	0.1		0.04		0.01
5500		Beculto		Beaulta	
0.00 0.20 0.40 Elapsed Ti	0.80 0.80 1.00 me[h]	Results		Results	
	· .	Q/s (m²/s)=	2.1E-07		
Log-Log plot incl. derivates- flov	w period	$T_M (m^2/s) =$	1.8E-07	— ; ;	
		Flow regime:	transient	Flow regime:	transient
10 ⁻⁴ 10 ⁻³ Elapsed time [h]	10 ⁻¹ 10 ⁰	dt_1 (min) =	1.54	dt ₁ (min) =	1.30
10 2 SKB Laxemar / KLX 04 565.64 - 670.64 (Chi	FlowDim Version 2.14b	$dt_2 (min) =$	19.73	dt ₂ (min) =	3.40
	(c) Golder Associates	$T(m^{2}/s) =$	5.8E-07	T (m²/s) =	7.1E-07
10 1		S (-) =	1.0E-06	S (-) =	1.0E-06
	10 ⁰	$K_s (m/s) =$	1.2E-07	$K_s (m/s) =$	1.4E-07
•	:	$S_{s}(1/m) =$	2.0E-07	S _s (1/m) =	2.0E-07
		C (m ³ /Pa) =	NA	C (m ³ /Pa) =	1.4E-10
×	10 ⁻⁷ 90	$C_{\rm D}(-) =$	NA	$C_{\rm D}(-) =$	1.6E-02
10 4		٤ (-) =	10.2	ع (-) =	14.8
	10 -2	5()		5()	
		$T_{opr}(m^2/s) =$		$T_{opc}(m^2/s) =$	
10 ¹¹ 10 ¹² 10 ¹³ 10	10 ¹⁴ 10 ¹⁵ 10 ³⁵	$S_{CRF}(-) =$		$S_{CRF}(-) =$	
		$D_{OBF}(-) =$		$D_{ORF}(-) =$	
l og-l og plot incl. derivatives- re	ecovery period	Selected represe	ntative naran	eters	
		$dt_{\ell}(min) =$	1 54	$C \left(m^{3} (D_{2}) \right) =$	1 4E-10
Elapsed time [h]		$dt_1 (min) =$	10.73	C (m /Pa) =	1.4E-10
10 ⁻² 5KB Laxemar / KLX 04	10 ⁻¹ 10 ⁰	$u_1(1111) =$	19.73	C _D (-) -	1.0E-02
565.64 - 570.64 / Chir	(c) Golder Associates	$I_{T}(m^{-}/s) =$	5.0E-07	ζ(-) =	10.5
-	300	S (-) =	1.0E-06		
and the second s	an 2	K _s (m/s) =	1.2E-07		
		$S_{s}(1/m) =$	2.0E-07		
	- 30 Z	Comments:			
	- 02 44	The recommended	transmissivity of	f 5.8E-7 m2/s was de	erived from the
10	10 ¹	analysis of the CHi	phase, which sh	ows the best data an	d derivative
		quality. The confide	ence range for the F_{-7} to 6 OF 7 m ²	le interval transmiss	ivity is
	3	during the test is ?	The static press	ure measured at tran	sducer denth
10 ' 10 2	10 ⁻³ 10 ⁻⁴ 10 ⁻⁵	was derived from th	e CHir phase us	sing straight line ext	rapolation in the
ID/CD		Horner plot to a val	ue of 5558.4 kP	a.	

	Test S	umr	nary Sheet			
Project:	Oskarshamn site investig	gation	Test type:[1]			Chir
Area:	Lax	emar	Test no:			1
Borehole ID:	к	LX04	Test start:			040906 07:42
Test section from - to (m):	570.64-575	.64 m	Responsible for test execution:			Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):		0.076	Responsible for test evaluation:		Crist	ian Enachescu
Linear plot Q and p			Flow period		Recovery period	
5850 -	18	0.30	Indata		Indata	
KLX04_570.64-575.64_040906_1_Chir_Q_r	•••••••••••••••••	0.00	p ₀ (kPa) =	5613		
5800 -		0.25	p _i (kPa) =	5607		
5750 -			p _p (kPa) =	5823	p _F (kPa) =	5609
P section Pabove		0.20	Q _p (m ³ /s)=	1.47E-06		
	•	[/min]	tp (s) =	1200	t _F (s) =	300
5650 5650		0.15 U	S el S [*] (-)=	1.00E-06	S el S [*] (-)=	1.00E-06
5600 m	╺╫╡┊╺┕╼┓。	Inject	EC _w (mS/m)=			
		- 0.10	Temp _w (gr C)=	15.8		
5550		- 0.05	Derivative fact.=	0.06	Derivative fact.=	0.02
5500 -						
5450 0.00 0.20 0.40 Elan	0.60 0.80 1.00 sed Time [h]	0.00	Results		Results	
			Q/s (m ² /s)=	6.7E-08		
Log-Log plot incl. derivates- f	ilow period		T _M (m²/s)=	5.5E-08		
			Flow regime:	transient	Flow regime:	transient
Elapsed time	[h] 10, ⁻¹		dt ₁ (min) =	0.54	dt ₁ (min) =	*
10 2 SKB Laxemar / KLX 04 570.64 - 575.64 / Chi	FlowDim Version 2.14b (c) Golder Associates]	dt_2 (min) =	1.37	dt ₂ (min) =	*
		30	T (m²/s) =	1.7E-07	T (m²/s) =	4.3E-07
er er te te disk disk at starter		10 1	S (-) =	1.0E-06	S (-) =	1.0E-06
10 1			$K_s (m/s) =$	3.3E-08	$K_s (m/s) =$	8.6E-08
		3	$S_s(1/m) =$	2.0E-07	$S_s(1/m) =$	2.0E-07
14qb/ (1		a, (1/q)' (mi	C (m³/Pa) =	NA	C (m ³ /Pa) =	2.0E-11
10 0	a san in the second second second second second second second second second second second second second second		$C_{\rm D}(-) =$	NA	$C_{\rm D}(-) =$	2.2E-03
		0.3	ξ(-) =	8.6	ξ(-) =	33.0
		10 -1	$T_{GRF}(m^2/s) =$		T _{GRF} (m ² /s) =	
10 ¹⁰ 10 ¹¹	10 ¹² 10 ¹³ 10 ¹	14	$S_{GRF}(-) =$		$S_{GRF}(-) =$	
			D _{GRF} (-) =		D _{GRF} (-) =	
Log-Log plot incl. derivatives	 recovery period 		Selected represe	entative paran	neters.	
			dt_1 (min) =	0.54	C (m ³ /Pa) =	2.0E-11
to ⁴ - ³ Elapsed time [1		dt_2 (min) =	1.37	C _D (-) =	2.2E-03
10 2 SKB Laxemar / KLX 04 570.64 - 575.64 / Chir	FlowDim Version 2.14b (c) Golder Associative		T _⊤ (m²/s) =	1.7E-07	ξ(-) =	8.6
		300	S (-) =	1.0E-06		
1		10 ²	$K_{s}(m/s) =$	3.3E-08		
10			$S_{s}(1/m) =$	2.0E-07		
		30 (7	Comments:			
		31 [jod 4]	*: IARF not measur	ed	51 7E 7 m2/a maa d	aniara d. Casara dha
10 °	.·	yd d	analysis of the CHi	phase. which sh	$0 \times 1.7 \text{ E} = 7 \text{ m} 2/8 was de ows the best data an$	d derivative
		3	quality. The confide	ence range for th	e interval transmiss	ivity is
	F	10 0	estimated to be 7.01	E-8 to 4.0E-7 m2	2/s. The analysis was	s conducted
10 ⁻¹ 10 ⁻²	10 ⁻³ 10 ⁻⁴ 10 ⁻⁵		assuming a flow dir	nension of 2. Th	the CHir phase using	asured at
to/cr			extrapolation in the	Horner plot to a	a value of 5609.7 kP	a.





	Test Sum	mary Sheet			
Project:	Oskarshamn site investigation	Test type:[1]			Chir
Area:	Laxemar	Test no:			1
Borehole ID:	KLX04	Test start:			040906 13:11
Test section from - to (m):	585.67-590.67 m	Responsible for test execution:			Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for		Crist	ian Enachescu
Linear plot Q and p		Flow period		Recovery period	
p		Indata		Indata	
6000 KLX04_585.67-590.67_040906_1_Chir_Q_r		p ₀ (kPa) =	5764		
5050	•	p _i (kPa) =	5762		
9990 •	- 0	p _p (kPa) =	5979	p _F (kPa) =	5763
P section	It i	$Q_{\rm p} ({\rm m}^3/{\rm s}) =$	2.72E-06	,	
P below	• • ^ي	tp(s) =	1200	t _F (s) =	300
2 % 2 5850 -	Rate [t/m	S el S [*] (-)=	1.00E-06	S el S [*] (-)=	1.00E-06
ownhole	light of the light	EC _w (mS/m)=		(/	
5800	╉╍╍╼╺╴	Temp _w (gr C)=	16.1		
		Derivative fact.=	0.02	Derivative fact.=	0.02
5750					
5700 0.20 0.40		Results		Results	
сыр	sea rinne (n)	Q/s (m²/s)=	1.2E-07		
Log-Log plot incl. derivates- fl	ow period	T _M (m ² /s)=	1.0E-07		
		Flow regime:	transient	Flow regime:	transient
10 ⁻⁴ 10 ⁻³ Elapsed time [r	j 10−1 10 ⁻⁰	$dt_1 (min) =$	0.07	dt ₁ (min) =	0.77
10 2 SKB Laxemar / KLX 04 585.67 - 590.67 / Chi	FlowDim Version 2.14b (c) Golder Associates	dt_2 (min) =	2.12	dt ₂ (min) =	2.45
	30	$T(m^{2}/s) =$	2.2E-07	T (m²/s) =	6.1E-07
	10 ¹	S (-) =	1.0E-06	S (-) =	1.0E-06
10 1		$K_s (m/s) =$	4.3E-08	$K_s (m/s) =$	1.2E-07
6	:	S _s (1/m) =	2.0E-07	S _s (1/m) =	2.0E-07
- 1640. (116	10° 10°	C (m³/Pa) =	NA	C (m ³ /Pa) =	1.7E-11
10 0		C _D (-) =	NA	$C_{D}(-) =$	1.9E-03
	0.3	ξ(-) =	3.0	ξ(-) =	21.6
	• •				
10 ⁵ 10 ⁶	10 ⁻⁷ 10 ⁻⁸ 10 ⁻⁹	T _{GRF} (m ² /s) =		T _{GRF} (m²/s) =	
di		S _{GRF} (-) =		$S_{GRF}(-) =$	
	<u> </u>	D _{GRF} (-) =		$D_{GRF}(-) =$	
Log-Log plot incl. derivatives-	recovery period	Selected represe	entative param	neters.	
		$dt_1 (min) =$	0.07	C (m³/Pa) =	1.7E-11
10 ⁻²	10, ² 10, ¹ 10, ¹ FlowDim Version 2.14b	$dt_2 (min) =$	2.12	$C_D(-) =$	1.9E-03
SRB Laxemar / RLX 04 585.67 - 590.67 / Chir	(c) Golder Associates	$T_T (m^2/s) =$	2.2E-07	ξ(-) =	3.0
	300	S (-) =	1.0E-06		
10 1	10 2	$K_s (m/s) =$	4.3E-08		
		$S_s(1/m) =$	2.0E-07		
pl q	30 Fe 30 J			22E.72/21	
	a 10 ¹ d	analysis of the CHi	phase which sh	ows the best data an	d derivative
		quality. The confide	ence range for th	e interval transmiss	ivity is
	3	estimated to be 8.01	E-8 to 5.0E-7 m2	2/s. The flow dimens	sion displayed
·	F 10 °	during the test is 2.	The static press	ure measured at tran	sducer depth,
10 ⁻² ID/CD	10 ³ 10 ⁴ 10 ³	Horner plot to a val	ue of 5762.3 kP	a.	aporation in the



	Test Summary Sheet						
Project:	Oskarshamn site investigation	Test type:[1]	С				
Area:	Laxemar	Test no:			1		
Borehole ID:	KLX04	Test start:		040906 16:36			
Test section from - to (m):	595.69-600.69 m	Responsible for test execution:		Jörg Böhne			
Section diameter, 2·r _w (m):	0.076	Responsible for		Crist	ian Enachescu		
l inear plot Ω and p		test evaluation:		Recovery period			
		Indata		Indata			
6150 KLX04_595.69-600.69_040906_1_Chir_Q_r	P section	p₀ (kPa) =	5862	indutu			
6100 -	P above 9 P below	p _i (kPa) =	-				
6050 -		$p_{p}(kPa) =$	-	p _F (kPa) =	-		
6000	7	$O_{(m^3/s)} =$	-	F1 ()			
re del		$d_p (m/s) =$	-	t⊧ (s) =	-		
9 5950 - 9	sate 5	+ (°) S d S [*] ()−	1.00E-06	S ol S [*] ()-	1 00E-06		
		5 er 3 (-)- FC (mS/m)=	1.002.00	3 el 3 (- <i>)</i> -	1.002.00		
		$Temp_{(ar C)} =$	16.2				
	+ 3	Derivative fact =	-	Derivative fact =	_		
5800 -	- 2			Bernative last.			
5750 -	- 1						
5700	1.00 1.20 1.40 1.60 1.80	Results		Results			
Elaps	ed Time [h]	Ω/c (m^2/c)	NA	Results			
l og l og plot incl. derivates, fl	ow period	$\frac{1}{2}$ $\frac{1}$	NA				
		T _M (III /S)-	transient	Flow regime:	transient		
		dt_{4} (min) =	-	dt_{ℓ} (min) =	-		
		$dt_1(min) =$	_	$dt_1 (min) =$	-		
		$T_{2}(m^{2}(a)) =$	NΔ	$T_{2}(m^{2}(a)) =$	NΔ		
		1 (m/s) =		1 (m/s) =			
		S(-) = K(m/c) = -		S(-) = K(m/c) = -			
Not Ar	alward	$R_{s}(11/5) =$		$R_{s}(11/3) =$			
Not Al	lafyseu	$S_{s}(1/11) =$		$S_{s}(1/11) =$			
		$C(m^{2}/Pa) =$		C (m ⁷ /Pa) =			
		$C_D(-) =$		$C_{\rm D}(-) =$			
		ζ(-) =	NA	ζ(-) =	NA		
		$T_{CPF}(m^2/s) =$		$T_{CPF}(m^2/s) =$			
		$S_{GRF}(-) =$		$S_{GRF}(-) =$			
		$D_{GRF}(-) =$		$D_{GRF}(-) =$			
Log-Log plot incl. derivatives-	recovery period	Selected represe	ntative param	neters.			
		dt ₁ (min) =	-	$C (m^{3}/Pa) =$	NA		
		dt_2 (min) =	-	$C_{D}(-) =$	NA		
		$T_{T}(m^2/s) =$	NA	ξ(-) =	NA		
		S (-) =	NA	5()			
		$K_s(m/s) =$	NA				
Not Ar	nalvsed	$S_{s}(1/m) =$	NA				
110171	luiyseu	Comments:					
		Based on the test re transmissivity is low	sponse (prolong ver than 1E-11 r	ed packer complian n2/s.	ce) the interval		

Test Summary Sheet						
Project:	Oskarshamn site investigatio	n <u>Test type:[1]</u>			Chir	
Area:	Laxema	ar Test no:			1	
Borehole ID:	KLX0	4 Test start:			040906 18:42	
Test section from - to (m):	600.69-605.6	9 Responsible for test execution:		Jörg Böhne		
Section diameter, $2 \cdot r_w$ (m):	0.07	6 Responsible for		Cristi	an Enachescu	
Linear plot Q and p		Flow period		Recovery period		
8150 -	- 20	Indata		Indata		
	KLX04_600.69-605.69_040906_1_Chir_Q_r	p ₀ (kPa) =	5909			
6100 -	1.8	p _i (kPa) =	5908			
	P section	p _p (kPa) =	6107	p _F (kPa) =	5908	
6050 -	P above 1.4	Q _p (m ³ /s)=	1.60E-05			
ि <u>क</u> 6000	12 ह	tp (s) =	1200	t _F (s) =	1200	
6 Pros su	1.0 gr	S el S [*] (-)=	1.00E-06	S el S [*] (-)=	1.00E-06	
6 5950 	0.8 ^t	EC _w (mS/m)=				
	0.6	Temp _w (gr C)=	16.3			
900	- 0.4	Derivative fact.=	0.13	Derivative fact.=	0.01	
5850	+ 02					
5800	0.0 0.80 1.00 1.20 1.40 1.80	Results		Results		
Elapso	d lime [h]	Q/s (m ² /s)=	7.9E-07			
Log-Log plot incl. derivates- fl	ow period	$T_{M} (m^{2}/s) =$	6.5E-07			
		Flow regime:	transient	Flow regime:	transient	
. Elapsed time (n]	dt ₁ (min) =	2.83	dt ₁ (min) =	3.15	
10 SKB Laxemar / KLX 04 60.69-605.69 / Chi	10, ⁻¹ 10, ⁰	dt_2 (min) =	16.46	dt ₂ (min) =	8.04	
0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0	FlowDim Version 2.14b (c) Golder Associates	T (m²/s) =	9.2E-07	T (m²/s) =	1.3E-06	
-	0.3	S (-) =	1.0E-06	S (-) =	1.0E-06	
10 °	· · [.	$K_s (m/s) =$	1.8E-07	$K_s (m/s) =$	2.6E-07	
· · · · · · · · · · · · · · · · · · ·	10	$S_{s}(1/m) =$	2.0E-07	S _s (1/m) =	2.0E-07	
(BA) (94	0.03	C (m ³ /Pa) =	NA	C (m³/Pa) =	8.4E-10	
- 10 ⁻¹	•	C _D (-) =	NA	C _D (-) =	9.2E-02	
	10 -2	ξ(-) =	0.0	ξ(-) =	3.5	
	0.003					
		$T_{GRF}(m^2/s) =$		$T_{GRF}(m^2/s) =$		
10 ⁴ 10 ⁵ 10	10 10 10	$S_{GRF}(-) =$		$S_{GRF}(-) =$		
		D _{GRF} (-) =		D _{GRF} (-) =		
Log-Log plot incl. derivatives-	recovery period	Selected represe	entative paran	neters.		
		dt ₁ (min) =	2.83	C (m³/Pa) =	8.4E-10	
Elapsed time [n]		dt ₂ (min) =	16.46	C _D (-) =	9.2E-02	
10 2 SKB Laxemar / KLX 04 600.69 - 605.69 / Chir	FlowDim Version 2.14b (c) Golder Associates	$T_{T} (m^{2}/s) =$	9.2E-07	ξ(-) =	0.0	
	10 3	S (-) =	1.0E-06			
	300	K _s (m/s) =	1.8E-07			
10		S _s (1/m) =	2.0E-07			
8	- 10 ²	Comments:				
		The recommended	transmissivity of	f 9.2E-7 m2/s was de	erived from the	
10 °	in a start s	analysis of the CHi	phase, which sh	ows the best data an	d derivative	
/	10 1	quality. The confide	ence range for the $7 \text{ to } 3 \text{ OF } 6 \text{ m}^2$	e interval transmissi	vity is	
	· •	during the test is ?	The static press	ure measured at trans	son aispiayea sducer denth	
	10 ² 10 ³ 10 ⁴	was derived from th	e CHir phase us	sing straight line extr	apolation in the	
1D/CD		Horner plot to a val	ue of 5907.7 kP	a.		





	Test S	umn	nary Sheet			
Project:	Oskarshamn site investig	gation	Test type:[1]			Chir
Area:	Lax	kemar	Test no:			1
Borehole ID:	К	LX04	Test start:			040907 00:39
Test section from - to (m):	615.70-6	20.70	Responsible for		Jörg Böhner	
Section diameter, $2 \cdot r_w$ (m):		0.076	Responsible for		Cristi	an Enachescu
Linear plot Q and p			Flow period		Recovery period	
			Indata		Indata	
6300	KLX04_615.70-620.70_040907_1_Chir_Q_r	- 2.50	p₀ (kPa) =	6055		
		2.25	p _i (kPa) =	6052		
6250 -		2.00	$p_{p}(kPa) =$	6251	p₌ (kPa.) =	6051
P section		1.75	O_{1} (m ³ /c)=	1 45E-05		0001
6200 P below		1.50 -	$Q_p (\Pi /S) =$	1200	t_ (s) =	1200
		ate []/mir	(p(3)) =	1.00E.06	(3) –	1.00E.06
6 8150 - 80 4	ι, Ι	ection R 1.25	Sel S (-)=	1.00E-00	S el S (-)=	1.00E-00
ă a		. 1.00 E	EC _w (mS/m)=	16.6		
		0.75	Temp _w (gr C)=	16.6		
6050		0.50	Derivative fact.=	0.10	Derivative fact.=	0.02
6000 0.00 0.20 0.40 0.60	0.80 1.00 1.20 1.4	0.00	Results		Results	
Elapsed	Time [h]		Ω/c (m^2/c)	7.1E-07		
l og l og plot incl. derivates- flo	ow period		$T_{\rm m}^2/c^2$	5 9E-07		
			T _M (III /S)-		Flow regime:	transient
			dt (min) =	1 02	dt (min) =	
Elapsed time (h)			$dt_1 (min) =$	1.03	$dt_1(min) =$	0.82
SKB Laxemar / KLX 04 615.70 - 620.70 / Chi	FlowDim Version 2.14b (c) Golder Associates	•	$dl_2(mn) =$	7.02	$dl_2(mn) = \frac{2}{2}$	4.00
		3	T (m²/s) =	1.7E-06	T (m²/s) =	4.4E-06
	الوجواني متياد والموالي والموالي	-10 °	S (-) =	1.0E-06	S (-) =	1.0E-06
10 1			K _s (m/s) =	3.4E-07	K _s (m/s) =	8.9E-07
		0.3	$S_s(1/m) =$	2.0E-07	$S_s(1/m) =$	2.0E-07
1000 the	•	(1/q) (min)	C (m³/Pa) =	NA	C (m³/Pa) =	1.5E-10
10 0		10 ⁻¹ ≨	C _D (-) =	NA	C _D (-) =	1.6E-02
		0.03	ξ(-) =	7.7	ξ(-) =	32.0
			- <u> </u>		- <u> </u>	
10 10 10 10 11	10 ¹² 10 ¹³ 10	10 -2	$T_{GRF}(m^2/s) =$		$T_{GRF}(m^2/s) =$	
			$S_{GRF}(-) =$		$S_{GRF}(-) =$	
	· · ·		$D_{GRF}(-) =$		$D_{GRF}(-) =$	
Log-Log plot incl. derivatives-	recovery period		Selected represe	ntative param	neters.	
			dt_1 (min) =	1.03	C (m³/Pa) =	1.5E-10
Elapsed time [h]		ł	dt_2 (min) =	7.62	C _D (-) =	1.6E-02
SKB Laxemar / KLX 04 615.70 - 620.70 / Chir	FlowDim Version 2.14b (c) Golder Associates	300	T _⊤ (m²/s) =	1.7E-06	ξ(-) =	7.7
			S (-) =	1.0E-06		
		10 2	$K_s (m/s) =$	3.4E-07		
		30	S _s (1/m) =	2.0E-07		
	·	en leve	Comments:			
		100-d) 00	The recommended t	ransmissivity of	f 1.7E-6 m2/s was de	rived from the
10 °	· · · · · · · · · · · · · · · · · · ·	4	analysis of the CHi	phase, which sh	ows the best data an	d derivative
		3	quality. The confide	ence range for the $3-7$ to 4.0 E 6 m ²	le interval transmissi	vity is
		10 °	during the test is ?	The static press	ure measured at tran	sducer denth
an ¹ ²	40 ³ 4 ⁴ 5		was derived from th	e CHir phase us	ing straight line extr	apolation in the
ານ 10 <u>ເ</u> ນີເດຍ	∾ 10 10 ⁻		Horner plot to a val	ue of 6050.3 kP	a	

	Test Summ	nary Sheet			
Project:	Oskarshamn site investigation	Test type:[1]			Chir
Area:	Laxemar	Test no:			1
Borehole ID:	KLX04	Test start:			040907 06:12
Test section from - to (m):	620.71-625.71 m	Responsible for test execution:			Jörg Böhner
Section diameter, 2·r _w (m):	0.076	Responsible for test evaluation:		Cristi	an Enachescu
Linear plot Q and p		Flow period		Recovery period	
		Indata		Indata	
KLX04_620.71-625.71_040907_1_Chir_Q_r	P section	p₀ (kPa) =	6102		
6300 •	Pabove P below	p _i (kPa) =	6097		
	• • • • • • • • • • • • • • • • • • •	p _p (kPa) =	6298	p _F (kPa) =	6098
6250 -		$Q_{p} (m^{3}/s) =$	8.25E-06		
5 6200 -	a. و ۵۰ -	tp(s) =	1200	t _F (s) =	300
Pressur		S el S [*] (-)=	1.00E-06	S el S [*] (-)=	1.00E-06
6150 6150 6150 6150 6150 6150 6150 6150	9 9 9 1 0.4	$EC_w (mS/m) =$			
5		Temp _w (gr C)=	16.7		
6100		Derivative fact.=	0.09	Derivative fact.=	0.04
6050					
6000 0.20 0.40	0.60 0.80 1.00 1.20	Results		Results	
Elaps	ad Time [h]	Q/s (m ² /s)=	4.0E-07		
Log-Log plot incl. derivates- fl	ow period	T_{M} (m ² /s)=	3.3E-07		
		Flow regime:	transient	Flow regime:	transient
Elassed time (151	dt_1 (min) =	10.61	dt_1 (min) =	0.34
10 ⁻⁴ 10 ⁻³ Linguist of the 10 ⁻³ 10 ⁻¹ 10 ² SKB Laxemar / KLX 04 620.71 - 625.71 / Chi	^{2²}	dt_2 (min) =	16.57	dt_2 (min) =	3.02
	(c) Golder Associates	$T(m^2/s) =$	5.5E-07	$T(m^2/s) =$	2.7E-06
		S (-) =	1.0E-06	S (-) =	1.0E-06
10	110 °	$K_s(m/s) =$	1.1E-07	$K_s(m/s) =$	5.3E-07
		$S_{s}(1/m) =$	2.0E-07	$S_{s}(1/m) =$	2.0E-07
(G 10 °	(journal)	$C_{(m^{3}/Pa)} =$	NA	$C_{(m^{3}/Pa)} =$	4.5E-11
4	10 ⁻¹ VI	$C_{D}(-) =$	NA	$C_{D}(-) =$	4.9E-03
10-1		ε ₀ () =	1.5	ε _θ () =	32.6
	* * 10 ⁻²	י) ר		· /) د	
		$T_{}(m^2/s) =$		$T_{}(m^2/s) =$	
10 ⁴ 10 ⁵ tC	10 ⁶ 10 ⁷ 10 ⁸	$S_{GRF}(-) =$		$S_{GRF}(-) =$	
		$D_{CRE}(-) =$		$D_{CRE}(-) =$	
Log-Log plot incl. derivatives-	recovery period	Selected represe	ntative param	neters.	
		dt₁ (min) =	10.61	$C (m^{3}/P_{2}) =$	4.5E-11
Flansed time thi		dt_2 (min) =	16.57	$C_{D}(-) =$	4.9E-03
10 ² 10 ² SKB Laxemar / KLX 04	10,-2 10,-1 FinuDim Version 2.14b	$T_{-}(m^{2}/c) =$	5.5E-07	ε ₍₋₎ =	1.5
620.71 - 625.71 / Chir	(c) Golder Associates 300	S(-) =	1.0E-06	ς (⁻) –	1.0
	- 10 ²	C() K (m/s) =	1.0E 00		
10 5		$S_{s}(1/m) =$	2.0E-07		
	30	Commonts:	2.00-07		
e ·	201 (Bea)	The recommended t	ronomiccivity	$f 5 5 E 7 m^{2/a} waa da$	rived from the
		analysis of the CHi	phase, which sh	ows the best data an	d derivative
10	3	quality. The confide	ence range for th	e interval transmissi	vity is
	• -	estimated to be 2.0F	E-7 to 9.0E-7 m2	2/s. The flow dimens	sion displayed
	10 °	during the test is 2.	The static press	ure measured at tran	sducer depth,
10 ¹ 10 ² tD/CD	10 ³ 10 ⁴ 10 ⁵	was derived from the	e CHIr phase us	sing straight line extr	apolation in the
		nomer plot to a val	ue 01 0070.4 KP	u.	

Project: Oskarshamn site investigation $\frac{1 \text{cst lype [1]}}{1 \text{ cst lype [1]}}$ Chi Area: Laxema Test no. 1 Borehole ID: KLX04 Test start: 040907 07.41 Test section from - to (m): 625.71-630.71 m Responsible for tere secution: Cristian Enachescu tere valuation: Cristian Ena	Test Summary Sheet							
Area:LaxemaTest no:1Borehole ID:KLXO4Test start:040907 07.41Test section from - to (m):625.71-630.71 mResponsible for teraulation:Cristian Enachescu teraulation:Section diameter, $2r_w$ (m):0.076Responsible for teraulation:Cristian Enachescu teraulation:Linear plot Q and pFlow periodIndata p, (kPa) = 6147 p, (kPa) = 6147 p, (kPa) = 6147 p, (kPa) = 2.9316.05 (p, (Pa) = 6148 Q, (m ² /s)= 2.9316.05 (p, (Pa) = 6148 Q, (m ² /s)= 2.9316.05 (p, (Pa) = 6148 Q, (m ² /s)= 2.9316.05 (p, (Pa) = 6168 C, (m ² /s)= 1.000-06 g sl S' (-) = 1.000-406 EC, (mS/m) = 1.000-06 g sl S' (-) = 1.000-406 EC, (mS/m) = 1.000-06 g sl S' (-) = 1.000-406 EC, (mS/m) = 1.446.06 C, (m ² /s)= 1.446.06 C, (m ² /s)= 1.446.06 C, (m ² /s)= 1.446.06 C, (m ² /s)= 1.446.06 C, (m ² /s)= 1.446.06 C, (m ² /s)= 1.426.06 (min) = 0.266 d, (min) = 1.2288 (c (min) = 0.266 S, (1/m) = 1.2288 (c (min) = 0.266 S, (1/m) = 1.2288 (c (min) = 2.06-107 S, (1/m) = 2.06-207 S, (1/m) = 1.2288 (c (min) = 2.06-107 S, (1/m) = 1.2288 (c (min) = 2.06-107 S, (1/m) = 1.2288 (c (min) = 2.06-107 S, (1/m) = 1.2288 (c (min) = 2.06-107 S, (1/m) = 1.2288 (c (min) = 2.06-107 S, (1/m) = 1.2288 (c (m) = 3.36-06 S, (1/m) = 1.2288 (c (m) = 3.36-06 S, (1/m) = 1.2288 (c (m) = 3.36-06 S, (1/m) = 1.2288 (c (m) = 3.26-07 C, (1 = 5.98 (c (= 5.98 (Project:	Oskarshamn site investigation	Test type:[1]			Chir		
Borehole ID: KLX04 Test start: 040907 07:41 Test section from - to (m): 625.71-630.71 m Responsible for the execution: Cristian Enachescuties texecution: East execution: Cristian Enachescuties texecution: East exacution: East execution:	Area:	Laxema	Test no:			1		
Test section from - to (m): 625.71-630.71 m Responsible for least evaluation: Cristian Enachesculates evaluation: Linear plot Q and p Flow period Indata	Borehole ID:	KLX04	Test start:			040907 07:41		
Section diameter, $2r_{w}$ (m): Linear plot Q and p The performance of the evaluation: Flow period The performance of the period of the period The performance of the period of the period The performance of the period of the period The performance of the period of the period The performance of the period of the period The performance of the period of the period of the period The performance of the period of the peri	Test section from - to (m):	625.71-630.71 m	Responsible for test execution:			Jörg Böhner		
Linear plot Q and p Flow period ndatata ndatata ndatata ndatata ndatata ndatatata ndatatatata ndatatatatatatatatatatatatatatatatatatat	Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for test evaluation:		Crist	ian Enachescu		
$ \frac{1}{10000000000000000000000000000000000$	Linear plot Q and p		Flow period		Recovery period			
$\frac{1}{1000} = \frac{1}{1000} + 1$			Indata		Indata			
$\int_{0}^{\infty} \frac{(kPa)^{2}}{(kPa)^{2}} = \frac{6142}{2.931.605}$ $\int_{0}^{\infty} \frac{(kPa)^{2}}{(kPa)^{2}} = \frac{6142}{2.931.605}$ $\int_{0}^{\infty} \frac{(kPa)^{2}}{(kPa)^{2}} = \frac{6142}{2.931.605}$ $\int_{0}^{\infty} \frac{(kPa)^{2}}{(kPa)^{2}} = \frac{6142}{2.931.605}$ $\int_{0}^{\infty} \frac{(kPa)^{2}}{(kPa)^{2}} = \frac{6142}{2.931.605}$ $\int_{0}^{\infty} \frac{(kPa)^{2}}{(kPa)^{2}} = \frac{6142}{2.931.605}$ $\int_{0}^{\infty} \frac{(kPa)^{2}}{(kPa)^{2}} = \frac{6142}{2.931.605}$ $\int_{0}^{\infty} \frac{(kPa)^{2}}{(kPa)^{2}} = \frac{6142}{2.931.605}$ $\int_{0}^{\infty} \frac{(kPa)^{2}}{(kPa)^{2}} = \frac{100E-06}{1.00E-06} \text{S et } S^{2}() = 1.00E-06$ $\int_{0}^{\infty} \frac{(kPa)^{2}}{(kPa)^{2}} = \frac{1.4E-06}{1.2E-06}$ $\int_{0}^{\infty} \frac{(m/s)^{2}}{(m/s)^{2}} = \frac{1.4E-06}{1.2E-06}$ $\int_{0}^{\infty} \frac{(m/s)^{2}}{(m/s)^{2}} = \frac{1.4E-06}{1.2E-06}$ $\int_{0}^{\infty} \frac{(m/s)^{2}}{(m/s)^{2}} = \frac{1.2E-06}{1.2E-06}$ $\int_{0}^{\infty} \frac{(m/s)^{2}}{(m/s)^{2}} = \frac{3.2E-06}{1.2E-06}$ $\int_{0}^{\infty} \frac{(m/s)^{2}}{(m/s)^{2}} = \frac{3.2E-06}{1.2E-06}$ $\int_{0}^{\infty} \frac{(m/s)^{2}}{(m/s)^{2}} = \frac{3.2E-06}{1.2E-06}$ $\int_{0}^{\infty} \frac{(m/s)^{2}}{(m/s)^{2}} = \frac{3.2E-06}{1.2E-06}$ $\int_{0}^{\infty} \frac{(m/s)^{2}}{(m/s)^{2}} = \frac{3.2E-06}{1.2E-06}$ $\int_{0}^{\infty} \frac{(m/s)^{2}}{(m/s)^{2}} = \frac{3.2E-06}{1.2E-06}$ $\int_{0}^{\infty} \frac{(m/s)^{2}}{(m/s)^{2}} = \frac{3.2E-06}{1.2E-06}$ $\int_{0}^{\infty} \frac{(m/s)^{2}}{(m/s)^{2}} = \frac{3.2E-06}{1.2E-06}$ $\int_{0}^{\infty} \frac{(m/s)^{2}}{(m/s)^{2}} = \frac{3.2E-06}{1.2E-06}$ $\int_{0}^{\infty} \frac{(m/s)^{2}}{(m/s)^{2}} = \frac{3.2E-06}{1.2E-06}$ $\int_{0}^{\infty} \frac{(m/s)^{2}}{(m/s)^{2}} = \frac{3.2E-06}{1.2E-06}$ $\int_{0}^{\infty} \frac{(m/s)^{2}}{(m/s)^{2}} = \frac{3.2E-06}{1.2E-06}$ $\int_{0}^{\infty} \frac{(m/s)^{2}}{(m/s)^{2}} = \frac{3.2E-06}{1.2E-06}$ $\int_{0}^{\infty} \frac{(m/s)^{2}}{(m/s)^{2}} = \frac{3.2E-06}{1.2E-06}$ $\int_{0}^{\infty} \frac{(m/s)^{2}}{(m/s)^{2}} = \frac{3.2E-06}{1.2E-06}$ $\int_{0}^{\infty} \frac{(m/s)^{2}}{(m/s)^{2}} = \frac{3.2E-06}{1.2E-06}$ $\int_{0}^{\infty} \frac{(m/s)^{2}}{(m/s)^{2}} = \frac{3.2E-06}{1.2E-06}$ $\int_{0}^{\infty} \frac{(m/s)^{2}}{(m/s)^{2}} = \frac{3.2E-06}{1.2E-06}$ $\int_{0}^{\infty} \frac{(m/s)^{2}}{(m/s)^{2}} = \frac{3.2E-06}{1.2E-06}$ $\int_{0}^{\infty} \frac{(m/s)^{2}}{(m/s)^{2}} = \frac{3.2E-06}{1.2E-06}$ $\int_{0}^{\infty} \frac{(m/s)^{2}}{(m/s)^{2}} = \frac{3.2E-06}{1.2E-07}$ $\int_{0}^{\infty} \frac{(m/s)^{2}}{(m/s)^{2}} = \frac{3.2E-06}{1$	6400 KLX04_625.71-630.71_040907_1_Chir_Q	_r 5.0	p₀ (kPa) =	6151				
$\int_{p_{i}} (kPa) = \frac{3}{347} \frac{p_{i}}{(kPa)} (kPa) = \frac{6}{148} \frac{p_{i}}{(kPa)$	6350 -	• 4.5	p; (kPa) =	6147				
$\int_{a} \frac{1}{(m^2/s)} = \frac{1}{(m^2/s)} + \frac{1}{(m^2/s)} = \frac{1}{(m^2/s)} + \frac{1}{(m^2/s)} = \frac{1}{(m^2/s)} + \frac{1}{($		▲ P above ■ P below 4.0	p (kPa) =	6347	n_(kPa)=	6148		
$\frac{1}{2} = \frac{1}$	6300 -	-3.5	$p_p(\mathbf{R} \mathbf{a}) =$	2.02E.05	p _F (Ki a) −	0148		
$\frac{\psi(s)^2 - 1.001/\psi(s)^2 - 0.000}{(s)^2 + 1.001/\psi(s)^2 - 0.000}$ $\frac{\psi(s)^2 - 1.001/\psi(s)^2 - 1.001/\psi(s)^2 - 0.000}{(s)^2 + 1.001/\psi(s)^2 + 1.001/\psi(s)^2 - 1.0$	a	•	$Q_p (m^2/s) =$	2.93E-03	t (a) -	600		
Set S (c) = 1.000-008 Set Set S (c) = 1.000-008 Set Set S (c) = 1.000-008 Set Set S (c	<u>8</u> 6250 -	te llumin	tp (s) =	1.005.00	ι _F (S) =	600		
$E_{w} (mSm) = 16.8$ $E_{w} (mSm) = 12.8-06$ $Flow regime: transient Flow regime: transient dt (min) = 0.26$ $E_{w} (mSm) = 12.26-06$ $E_{w} (m/S) = 3.16-06$ $E_{w} (m/S) = 6.16-07$ $E_{w} (m/S) = 6.16-07$ $E_{w} (m/S) = 16.8$ $E_{w} (mSm) = 2.06-07$ $E_{w} (mSm) = 2.06-07$ $E_{w} (mSm) = 2.06-07$ $E_{w} (mSm) = 2.06-07$ $E_{w} (mSm) = 12.28$ $E_{w} $	e 1 e 1 e 1 e 1 e 1 e 1 e 1 e 1 e 1 e 1	- 2.5 æ 5	S el S (-)=	1.00E-06	S el S (-)=	1.00E-06		
$ \begin{array}{c c c c c c c c c c c c c c c c c c c $		2.0 \$	EC _w (mS/m)=					
Derivative fact = 0.09 Derivative fact.= 0.02 Derivative fact = 0.00 Derivative fact.= 0.02 Derivative fact = 0.00 Derivative fact.= 0.02 Derivative fact = 0.00 Derivative fact.= 0.02 Derivative fact = 0.00 Derivative fact.= 0.02 Derivative fact = 0.00 Derivative fact.= 0.02 Derivative fact = 0.00 Derivative fact.= 0.02 Derivative fact.= 0.00 Derivative fact.= 0.00 Derivative fact.= 0.00 Derivative fact.= 0.00 Derivative fact.= 0.00 Derivative fact.= 0.00 Derivative fact.= 0.00 Derivative fact.= 0.00 Derivative fact.= 0.00 Derivative fact.= 0.00 Derivative fact.= 0.00 Derivative fact.= 0.00 Derivative fact.= 0.00 Derivative fact.= 0.00 Derivative fact.= 0.00 Derivative fact.= 0.00 Derivative fact.= 0.00 Derivativ	6150	1.5	Temp _w (gr C)=	16.8				
$\frac{1}{2} = \frac{1}$		1.0	Derivative fact.=	0.09	Derivative fact.=	0.02		
$\frac{1}{100} + \frac{1}{100} + \frac{1}{100} + \frac{1}{100} + \frac{1}{100} + \frac{1}{100} + \frac{1}{100} + \frac{1}{1000} + \frac{1}{1000} + \frac{1}{10000} + \frac{1}{10000000000000000000000000000000000$	6100	+ 0.5						
$\frac{\operatorname{Results}}{\operatorname{O}_{S}} = \frac{\operatorname{Results}}{\operatorname{O}_{S}} \frac{\operatorname{O}_{S}}{\operatorname{O}_{S}} = \frac{\operatorname{O}_{S}}{$	8050	0.0	Beaulta		Baaulta			
$\begin{aligned} \text{Log-Log plot incl. derivates- flow period} \\ \text{Log-Log plot incl. derivates- flow period} \\ \text{T}_{u} (m^2/s) = 1.2E-06 \\ \text{Twr sign:} transient Flow regime: transient tht (min) = 0.26 \\ \text{d}_2 (min) = 12.28 \\ \text{d}_2 (min) = 12.28 \\ \text{d}_2 (min) = 12.28 \\ \text{d}_2 (min) = 12.28 \\ \text{d}_2 (min) = 12.28 \\ \text{d}_2 (min) = 12.28 \\ \text{d}_2 (min) = 12.28 \\ \text{d}_2 (min) = 12.28 \\ \text{d}_2 (min) = 12.28 \\ \text{d}_2 (min) = 12.28 \\ \text{d}_2 (min) = 12.28 \\ \text{d}_2 (min) = 12.28 \\ \text{d}_2 (min) = 2.0E-07 \\ \text{S}_3 (1/m) = 2.0E-07 \\ \text{S}_6 (1/m) = 2.0E-07 \\ \text{S}_6 (1/m) = 2.0E-07 \\ \text{S}_6 (1/m) = 2.0E-07 \\ \text{S}_8 (1/m) = 3.70 \\ \text{C}_0 (-) = 0 \\ \text{D}_{GRF} (-) = 0 \\ \text{D}_{GRF} (-) = 0 \\ \text{D}_{GRF} (-) = 0 \\ \text{D}_{GRF} (-) = 0 \\ \text{D}_{GRF} (-) = 0 \\ \text{S}_8 (1/m) = 12.28 \\ \text{C}_0 (-) = 2.2E-02 \\ \text{S}_6 (-) = 0 \\ \text{D}_{GRF} (-) = 0 \\ \text{D}_{GRF} (-) = 0 \\ \text{D}_{GRF} (-) = 0 \\ \text{D}_{GRF} (-) = 0 \\ \text{D}_{GRF} (-) = 0 \\ \text{C}_0 (-) = 0 \\ $	Elaps	ed Time [h]			Results			
Log-Log plot incl. derivates now period $T_{M}(m/s) = 1.22-00$ Flow regime: transient Flow regime: a signification in the significat			Q/s (m ⁻ /s)=	1.4E-00		L		
$\int_{a_{1}}^{b_{1}} \int_{a_{2}}^{b_{2}} \int_{a_{1}}^{b_{2}} \int_{a_{2}}^{b_{2}} \int_{a_{1}}^$	Log-Log plot Incl. derivates- fi	ow period	T _M (m²/s)=	1.2E-06	-			
$\int_{a_{1}}^{a_{2}} \int_{a_{2}}^{a_{2}} \int_{a_{1}}^{a_{2}} \int_{a_{2}}^{a_{2}} \int_{a_{1}}^{a_{2}} \int_{a_{2}}^{a_{2}} \int_{a_{1}}^{a_{2}} \int_{a_{2}}^{a_{2}} \int_{a_{1}}^{a_{2}} \int_{a_{2}}^{a_{2}} \int_{a_{1}}^{a_{2}} \int_{a_{2}}^{a_{2}} \int_{a_{1}}^{a_{2}} \int_{a_{1}}^{a_{2}} \int_{a_{1}}^{a_{2}} \int_{a_{1}}^{a_{1}} \int_{a_{1}}^$			Flow regime:	transient	Flow regime:	transient		
$\frac{d_{2}(\min) = 12.28}{(m/n) = 3.1E-06} T(m^{2}/s) = 3.3E-06$ $S(\cdot) = 1.0E-06 S(\cdot) = 1.0E-06$ $S(\cdot) = 1.0E-06 S(\cdot) = 0.0E-07$ $S_{s}(1/m) = 2.0E-07 S_{s}(1/m) = 2.0E-07$ $S_{s}(1/m) = 2.0E-07 S_{s}(1/m) = 2.0E-07$ $S_{s}(1/m) = 0.0E-07 S_{s}(1/m) = 2.0E-07$ $S_{s}(1/m) = 0.0E-07 S_{s}(1/m) = 0.0E-07$ $S_{s}(1/m) = 0.0E-07 S_{s}(1/m) = 0.0E-07$ $S_{s}(1/m) = 0.0E-07 S_{s}(1/m) = 0.0E-07$ $S_{s}(1/m) = 0.0E-07 S_{s}(1/m) = 0.0E-07$ $S_{s}(1/m) = 0.0E-07 S_{s}(1/m) = 0.0E-07$ $S_{s}(1/m) = 0.0E-07 S_{s}(1/m) = 0.0E-07$ $S_{s}(1/m) = 0.0E-07 S_{s}(1/m) = 0.0E-07$ $S_{s}(1/m) = 0.0E-07 S_{s}(1/m) = 0.0E-07$ $S_{s}(1/m) = 0.0E-07 S_{s}(1/m) = 0.0E-07$ $S_{s}(1/m) = 0.0E-07 S_{s}(1/m) = 0.0E-07$ $S_{s}(1/m) = 0.0E-07 S_{s}(1/m) = 0.0E-07$ $S_{s}(1/m) = 0.0E-07 S_{s}(1/m) = 0.0E-07$ $S_{s}(1/m) = 0.0E-06 S_{s}(1/m) = 0.0E-07 S_{s}(1/m) = 0.0E-07$ $S_{s}(1/m) = 0.0E-06 S_{s}(1/m) = 0.0E-07 S_{s}(1/m) = 0.0E-07$ $S_{s}(1/m) = 0.0E-06 S_{s}(1/m) = 0.0E-07 S_{s}(1/m) = 0.0E-07 S_{s}(1/m) = 0.0E-07 S_{s}(1/m) = 0.0E-07 S_{s}(1/m) = 0.0E-07 S_{s}(1/m) = 0.0E-07 S_{s}(1/m) = 0.0E-07 S_{s}(1/m) = 0.0E-07 S_{s}(1/m) = 0.0E-07 S_{s}(1/m) = 0.0E-07 S_{s}(1/m) = 0.0E-07 S_{s}(1/m) = 0.0E-06 S_{s}(1/m) = 0.0E-07 S_{s}(1/m) = 0.0E-07 S_{s}(1/m) = 0.0E-06 S_{s}(1/m) = 0.0E-07 S_{s}(1/m) = 0.0E-07 S_{s}(1/m) = 0.0E-07 S_{s}(1/m) = 0.0E-07 S_{s}(1/m) = 0.0E-07 S_{s}(1/m) = 0.0E-06 S_{s}(1/m) = 0.0E-07 S_{s}(1/m) = 0.0E$	Elapsed time (h	10, ⁻¹	dt_1 (min) =	3.70	dt_1 (min) =	0.26		
$\int_{a_{a_{a_{a_{a_{a_{a_{a_{a_{a_{a_{a_{a_$	SKB Laxemar / KLX 04 625.71 - 630.71 / CN	FlowDim Version 2.14b (c) Golder Associates	dt_2 (min) =	12.28	dt_2 (min) =	4.45		
$S(\cdot) = 1.0E-06 S(\cdot) = 1.0E-06 S(\cdot) = 1.0E-06 S(\cdot) = 1.0E-06 S(\cdot) = 1.0E-06 S(\cdot) = 1.0E-06 S(\cdot) = 1.0E-06 S(\cdot) = 1.0E-06 S(\cdot) = 0.7E-07 S(\cdot)$		10 °	T (m²/s) =	3.1E-06	T (m²/s) =	3.3E-06		
$\int_{a_{1}}^{a_{2}} \int_{a_{2}}^{a_{2}} \int_{a_{1}}^{a_{2}} \int_{a_{2}}^{a_{2}} \int_{a_{1}}^{a_{2}} \int_{a_{2}}^{a_{2}} \int_{a_{1}}^{a_{2}} \int_{a_{1}}^{a_{2}} \int_{a_{1}}^{a_{1}} \int_{a_{1}}^$	10 1		S (-) =	1.0E-06	S (-) =	1.0E-06		
$\int_{a}^{a} \int_{a}^{b} \int_{a$	-	- 10 ⁻¹	$K_{s}(m/s) =$	6.1E-07	$K_s (m/s) =$	6.7E-07		
$\int_{\mathbb{R}^{d}} \int_{$	چ ₁₀ د	5	S _s (1/m) =	2.0E-07	$S_{s}(1/m) =$	2.0E-07		
$\int_{\mathbb{R}^{n}} \int_{$		June 1990	C (m³/Pa) =	NA	C (m³/Pa) =	2.0E-10		
$\frac{1}{2} = \frac{1}$	· · · ·	10 ⁻² ^g	C _D (-) =	NA	C _D (-) =	2.2E-02		
$\frac{1}{10^{-10^{-10^{-10^{-10^{-10^{-10^{-10^{$	10 -1		ξ(-) =	5.9	ξ(-) =	6.9		
$T_{GRF}(m^2/s) = T_{GRF}(m^2/s) =$ $T_{GRF}(n^2/s) = T_{GRF}(n^2/s) =$ $T_{GRF}(-) = D_{GRF}(-) =$ $D_{GRF}(-) = D_{GRF}(-) =$ $D_{GRF}(-) = D_{GRF}(-) =$ $D_{GRF}(-) = 0$ $T_{T}(m^2/s) = 3.10E - 06 (5 - 1) = 2.2E - 02$ $T_{T}(m^2/s) = 3.1E - 06 (5 - 1) = 2.2E - 02$ $T_{T}(m^2/s) = 3.1E - 06 (5 - 1) = 5.9$ $S(-) = 1.0E - 06$ $K_{S}(m/s) = 6.1E - 07$ $S_{S}(1/m) = 2.0E - 07$ $S_{S}(1/m) = 2.0E - 07$ $S_{S}(1/m) = 2.0E - 07$ $T_{S}(1/m) = 2.0E - 07$ $T_{S}(1/m) = 2.0E - 07$ $T_{T}(m^2/s) = 3.1E - 6 m^2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 9.0E - 7 to 6.0E - 6 m^2/s. The flow dimension displayed$		- 10 ⁻³						
$S_{GRF}(-) = S_{GRF}(-) = D_{$	10.10 10.10	10.11 10.12 10.13	$T_{GRF}(m^2/s) =$		$T_{GRF}(m^2/s) =$			
$D_{GRF}(-) = D_{$			$S_{GRF}(-) =$		$S_{GRF}(-) =$			
Log-Log plot incl. derivatives- recovery periodSelected representative parameters. u_1 u_2 u_3 u_4 u_1 u_1 u_1 u_2 u_3 u_4 u_1 u_1 u_1 u_2 u_2 u_3 u_4 u_1 u_1 u_1 u_2 u			D _{GRF} (-) =		D _{GRF} (-) =			
$\frac{10^{-1}}{10^{-1}} \xrightarrow{10^{-1}}{10^{-1}} 10$	Log-Log plot incl. derivatives-	recovery period	Selected represe	ntative paran	neters.			
$g_{g}^{*} = \frac{10^{\circ}}{10^{\circ}} = \frac{10^{\circ}}{10^{\circ}} = \frac{10^{\circ}}{10^{\circ}} = \frac{10^{\circ}}{10^{\circ}} = \frac{10^{\circ}}{10^{\circ}} = \frac{10^{\circ}}{10^{\circ}} = \frac{12.28}{C_{D}} = 12$			$dt_1(min) =$	3.70	C (m ³ /Pa) =	2.0E-10		
$\frac{1}{10^{-1}} = \frac{1}{10^{-1}$	10 ⁻⁵ 10 ⁻⁴ Elapsed time	[b] 10 ⁻² 10 ⁻¹ 10 ⁻⁰	dt_2 (min) =	12.28	$C_{D}(-) =$	2.2E-02		
$S_{g} = 0$ S_{g	10 ² SKB Laxemar / KLX 04 625.71 - 630.71 / Chir	FlowDim Version 2.14b 10 3 (c) Golder Associates	$T_{-}(m^{2}/s) =$	3.1F-06	ξ(-) =	5.9		
$G_{g} = \frac{1}{2}$ $G_{g} = $			S(-) =	1 0F-06	י) כ			
$S_{s} (1/m) = 2.0E-07$ Comments: The recommended transmissivity of 3.1E-6 m2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 9.0E-7 to 6.0E-6 m2/s. The flow dimension displayed	10 1		C () K (m/s) =	6.1E-07		╉────┤		
^B _g ^w ^o ^w ^w ^o ^w ^o ^w ^o ^w ^w ^o ^w ^w ^o ^w ^w ^o		10 -	$S_{s}(11/m) =$	0.1E-07		╉────┤		
The recommended transmissivity of 3.1E-6 m2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 9.0E-7 to 6.0E-6 m2/s. The flow dimension displayed			$O_{s}(1/11) =$	2.02-07				
¹ In the recommended transmissivity of 3.1E-6 m2/s was derived from the analysis of the CHi phase, which shows the best data and derivative quality. The confidence range for the interval transmissivity is estimated to be 9.0E-7 to 6.0E-6 m2/s. The flow dimension displayed	10 °10 °1	10 ¹			C2 1E (2/2			
¹⁰ quality. The confidence range for the interval transmissivity is estimated to be 9.0E-7 to 6.0E-6 m2/s. The flow dimension displayed		di	analysis of the CHi	phase which sh	1 3.1 E-0 m2/s was de	d derivative		
estimated to be 9.0E-7 to 6.0E-6 m2/s. The flow dimension displayed	10 -1	•	quality. The confide	ence range for th	e interval transmiss	ivity is		
		10 °	estimated to be 9.01	E-7 to 6.0E-6 m	2/s. The flow dimens	sion displayed		
during the test is 2. The static pressure measured at transducer depth,			during the test is 2.	The static press	ure measured at tran	sducer depth,		
was derived from the CHir phase using straight line extrapolation in the Horner plot to a value of 6145.4 kPa.	10 ⁰ 10 ¹ 10 10 10 10 10 10 10 10 10 10 10 10 10	10	was derived from the Horner plot to a val	e CHir phase us ue of 6145.4 kP	sing straight line extr a.	apolation in the		

	Test Sumr	nary Sheet				
Project:	Oskarshamn site investigation	Test type:[1]		С		
Area:	Laxemar	Test no:			1	
Borehole ID:	KLX04	Test start:			040907 09:16	
Test section from - to (m):	630.72-635.72 m	Responsible for test execution:			Jörg Böhner	
Section diameter, 2·r _w (m):	0.076	Responsible for		Crist	ian Enachescu	
Linear plot Ο and p		test evaluation:		Recovery period		
		Indata		Indata		
6300 KLX04 630.72-635.72 040907 1 Chir Q	10	p_0 (kPa) =	6199	indata		
6280 •	- P section ▲ P above ● 9	p; (kPa) =	-			
6260		$p_{\rm p}({\rm kPa}) =$	-	p₌ (kPa.) =	-	
6240		$\rho_{\rm p}({\rm m}^3/{\rm c}) =$	-			
	• • - 6	$\frac{Q_p(\Pi / S)}{tn(S)} =$	-	tr (s) =	_	
Co	at 5 test	(p(0))	1.00E-06	r (0)	1.00E-06	
P P P P P P P P P P P P P P P P P P P		5 er 5 (-)= EC (mS/m)=	1.002 00	5 el 5 (- <i>)</i> -	1.001 00	
Å ⁶¹⁸⁰ ●	4 =	$EO_{W}(IIIO/III)^{-}$	16.8			
6160 -	- 3	Derivative fact =	10.0	Derivative fact =		
6140	2	Derivative lact	-	Derivative lact	-	
6120 -	r -1					
6100		Boculto		Poculto		
0.00 0.10 0.20 0.30 0.40 Elaps	ed Time [h]	C_{12} (m^{2} /z)	ΝΑ	Results	1	
Log Log plot incl. dorivator, fl	aw pariod	Q/s (m /s)=				
Log-Log plot men derivates- m	ow period	I _M (m ⁻ /s)=	INA	Flow regime:	transiant	
		Flow regime.	transient	riow regime.	transient	
		$dl_1 (min) =$	-	$dl_1 (min) =$	-	
		$u_2(11111) =$	-	dl_2 (IIIII) =	-	
		I (m ⁻ /s) =		I (m ⁻ /s) =		
		S (-) =		S (-) =		
	1	K_{s} (ff/s) =		$\kappa_{\rm s}$ (m/s) =		
Not Ar	halysed	$S_{s}(1/11) =$		$S_{s}(1/11) =$		
		C (m [°] /Pa) =		C (m [×] /Pa) =		
		$C_D(-) =$		$C_{\rm D}(-) =$		
		ξ(-) =	NA	ξ(-) =	NA	
		$T_{(m^2(a))} =$		$T_{(m^2/a)} =$		
		$I_{GRF}(III / S) =$		$I_{GRF}(III /S) =$		
		$D_{\text{GRF}}(-) =$		$D_{\text{GRF}}(-) =$		
Log-Log plot incl. derivatives-	recovery period	Selected represe	ntative paran	PGRF ()		
		dt₄ (min) =		$C (m^3/Pc) =$	NA	
		dt_2 (min) =	-	$C_{\rm D}(-) =$	NA	
		$T_{12}(m^2/c) =$	NA	ε ₍₋₎ =	NA	
		S(-) =		ς (-)		
		K (m/s) =				
Not Analysed		$S_{a}(1/m) =$	NA			
		Commonts:				
		Comments.	anonao (nrolona	ad nashar complian	as) the interval	
		transmissivity is low	sponse (proiong ver than 1E-11 r	m2/s	ce) the interval	
		No further analysis	recommended.			
		, ,				

Test Summary Sheet						
Project:	Oskarshamn site investigation	Test type:[1]			0	
Area:	Laxemar	Test no:			1	
Borehole ID:	KLX04	Test start:			040907 10:44	
Test section from - to (m):	635.72-640.72 m	Responsible for test execution:			Jörg Böhner	
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for		Crist	ian Enachescu	
Linear plot Q and p		Flow period		Recovery period		
		Indata		Indata		
6500 KLX04_635.72-640.72_040907_1_Chir_Q_r	5.0	p₀ (kPa) =	6248			
6450 -	4.5	p _i (kPa) =	-			
	4.0	p _p (kPa) =	-	p _F (kPa) =	-	
6400 - P section P above	- 3.5	$Q_{p} (m^{3}/s) =$	-			
P below 6350	³⁰ 둩	tp(s) =	-	t _F (s) =	-	
Pressur	2.5 E	S el S [*] (-)=	1.00E-06	S el S [*] (-)=	1.00E-06	
901 6300 1	100 to 10	$EC_w (mS/m) =$				
° •		Temp _w (gr C)=	16.9			
6250	•	Derivative fact.=	-	Derivative fact.=	-	
6200	• 1.0					
	• - 0.5 •					
6150	0.0 0.80 1.00 1.20	Results		Results		
Elaps	Time [h]	$Q/s (m^2/s) =$	NA			
Log-Log plot incl. derivates- fl	ow period	$T_{\rm M}$ (m ² /s)=	NA			
0 01	•	Flow regime:	transient	Flow regime:	transient	
		dt₁(min) =	-	dt₁ (min) =	-	
		dt_2 (min) =	-	dt_2 (min) =	-	
		$T(m^2/s) =$	NA	$T(m^2/s) =$	NA	
		S (-) =	NA	S (-) =	NA	
		$K_{s}(m/s) =$	NA	$K_{s}(m/s) =$	NA	
Not Ar	nalvsed	S _s (1/m) =	NA	$S_{s}(1/m) =$	NA	
	lulysed	$C (m^{3}/Pa) =$	NA	$C_{\rm m}^{3}/Pa) =$	NA	
		$C_{\rm D}(-) =$	NA	$C_{D}(-) =$	NA	
		ε ₍₋₎ =	NA	ε ₀ () =	NA	
		5 ()		()		
		$T_{}(m^2/s) =$		$T_{}(m^2/c) =$		
		$S_{GRF}(-) =$		$S_{GRF}(-) =$		
		$D_{GRF}(-) =$		$D_{GRF}(-) =$		
Log-Log plot incl. derivatives-	recovery period	Selected represe	ntative param	neters.		
5	· · · · · · · · · · · · · · · · · · ·	dt_1 (min) =	-	$C_{(m^{3}/Pa)} =$	NA	
		dt_2 (min) =	-	$C_{D}(-) =$	NA	
		$T_{\tau}(m^2/s) =$	NA	ε (-) =	NA	
		S(-) =	NA	י אר גע		
Not Analysed		$K_s(m/s) =$	NA			
		$S_{s}(1/m) =$	NA			
		Commente			I	
	Based on the test re transmissivity is lov No further analysis	sponse (prolong ver than 1E-11 r recommended.	ed packer compliand n2/s.	ce) the interval		

Test Summary Sheet					
Project:	Oskarshamn site investigation	Test type:[1]	C		
Area:	Laxemar	Test no:			1
Borehole ID:	KLX04	Test start:		040907 12:29	
Test section from - to (m):	640.73-645.73 m	Responsible for test execution:			Jörg Böhner
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for		Crist	ian Enachescu
Linear plot Q and p		Flow period		Recovery period	
	10	Indata		Indata	
KLX04_640.73-645.73_040907_1_Chir_	Q_r • P section	p₀ (kPa) =	6299		
6380 -	P above P P below	p _i (kPa) =	-		
6360 -		$p_{p}(kPa) =$	-	p _F (kPa) =	-
6340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 340 6 3	7 7	$Q_{2} (m^{3}/s) =$	-		
हु 6320 - १		tp(s) =	-	t _F (s) =	-
8 8 6300 8	- 5 - 5 - 6	S el S [*] (-)=	1.00E-06	S el S [*] (-)=	1.00E-06
6280 -		$EC_w (mS/m) =$			
6260 -	• 3	Temp _w (gr C)=	17.0		
6240 -		Derivative fact.=	-	Derivative fact.=	-
6220					
02201	•				
6200 0.10 0.20 0.30 0.40	0 0.50 0.60 0.70 0.80 0.90 1.00 sed Time [h]	Results		Results	
		Q/s (m ² /s)=	NA		
Log-Log plot incl. derivates- fl	low period	T _M (m ² /s)=	NA		
		Flow regime:	transient	Flow regime:	transient
		dt ₁ (min) =	-	dt ₁ (min) =	-
		dt ₂ (min) =	-	dt ₂ (min) =	-
		T (m²/s) =	NA	T (m²/s) =	NA
		S (-) =	NA	S (-) =	NA
		K_{s} (m/s) =	NA	K_{s} (m/s) =	NA
Not Ar	nalysed	S _s (1/m) =	NA	S _s (1/m) =	NA
	-	C (m ³ /Pa) =	NA	C (m³/Pa) =	NA
		C _D (-) =	NA	C _D (-) =	NA
		ξ(-) =	NA	ξ(-) =	NA
		T _{GRF} (m ² /s) =		T _{GRF} (m ² /s) =	
		S _{GRF} (-) =		S _{GRF} (-) =	
		D _{GRF} (-) =		D _{GRF} (-) =	
Log-Log plot incl. derivatives-	recovery period	Selected represe	ntative param	neters.	.
		dt_1 (min) =	-	C (m³/Pa) =	NA
		$dt_2(min) =$	-	$C_{D}(-) =$	NA
		$T_T (m^2/s) =$	NA	ξ(-) =	NA
		S (-) =	NA		
.	1 1	κ_{s} (m/s) =	NA		ļ
Not Analysed		$S_{s}(1/m) =$	NA		
		Comments:	(1		
		Based on the test re	sponse (proiong ver than 1E-11 r	ed packer compliant	ce) the interval
		No further analysis	recommended.		
		-			

	Test	Sumn	nary Sheet			
Project: Oskarsham	n site inves	tigation	Test type:[1]			Chir
Area:	La	axemar	Test no:			1
Borehole ID:	KLX04		Test start:		04090	
Test section from - to (m):	645.73-65	50.73 m	Responsible for test execution:		Jörg Böh	
Section diameter, 2·r _w (m):		0.076	Responsible for test evaluation:		Crist	ian Enachescu
Linear plot Q and p			Flow period		Recovery period	
· · · · · · · · · · · · · · · · · · ·			Indata		Indata	
KLX04_645.73-650.73_040907_1_Chir_Q_r		0.010	p ₀ (kPa) =	6350		
6550	P section		p _i (kPa) =	6354		
	P above P helow	- 0.008	p _p (kPa) =	6566	p _F (kPa) =	6352
8500 -	Q		$Q_{p} (m^{3}/s) =$	6.67E-08		
e 86 6450 -		- 0.006 Ē	tp (s) =	1200	t _F (s) =	600
Pressor		n Rate []∧	S el S [*] (-)=	1.00E-06	S el S [*] (-)=	1.00E-06
		oto ula 1004	EC _w (mS/m)=			
			Temp _w (gr C)=	17.1		
6350			Derivative fact.=	0.23	Derivative fact.=	0.02
6300		- 0.002				
0.00 0.20 0.40 0.60 0.80 Elapsed Time [h]	1.00	1.20	Results		Results	
			Q/s (m²/s)=	3.1E-09		
Log-Log plot incl. derivates- flow period			T _M (m²/s)=	2.5E-09		
			Flow regime:	transient	Flow regime:	transient
Elapsed time [h]	10 0		dt_1 (min) =	0.92	dt ₁ (min) =	*
10 2 SKB Laxemar / KLX 04 645.73 - 650.73 / Chi	FlowDim Version 2.1 (c) Golder Associate	14b 5	dt_2 (min) =	10.33	dt ₂ (min) =	*
		10 3	T (m ² /s) =	2.8E-09	T (m²/s) =	6.9E-09
10 '		_	S (-) =	1.0E-06	S (-) =	1.0E-06
			$K_s (m/s) =$	5.7E-10	$K_s (m/s) =$	1.4E-09
		10 *	$S_{s}(1/m) =$	2.0E-07	S _s (1/m) =	2.0E-07
		(14gr [mint]	C (m³/Pa) =	NA	C (m³/Pa) =	1.4E-11
		10 1	C _D (-) =	NA	C _D (-) =	1.6E-03
10 ⁻⁴		ł	ξ(-) =	1.9	ξ(-) =	10.1
		10 0				
10 ⁻³ 10 ⁻⁴ 10 ⁻⁵		10 6	$T_{GRF}(m^2/s) =$		T _{GRF} (m ² /s) =	
10			S _{GRF} (-) =		S _{GRF} (-) =	
			D _{GRF} (-) =		D _{GRF} (-) =	
Log-Log plot incl. derivatives- recovery per	iod		Selected represe	entative paran	neters.	
			$dt_1 (min) =$	0.92	C (m ³ /Pa) =	1.4E-11
Elapsed time [0]	. 10.°		dt_2 (min) =	10.33	C _D (-) =	1.6E-03
SKB Laxemar / RLX 04 645.73 - 650.73 / Chir	FlowDim Version 2.14b (c) Golder Associates	10 3	$T_{T} (m^{2}/s) =$	2.8E-09	ξ(-) =	1.9
			S (-) =	1.0E-06		
		300	$K_s (m/s) =$	5.7E-10		
		10 2	$S_{s}(1/m) =$	2.0E-07		
		(Leal)	Comments:			
		- 39 - 06-00	The recommended	transmissivity of	2.8E-9 m2/s was de	erived from the
		10 ¹	analysis of the CHi	phase, which sh	ows the best data an	d derivative
			quality. The confide estimated to be 7.01	Ence range for th	e interval transmiss 12/s. The analysis w	ivity 18 as conducted
		3	assuming a flow dir	nension of 2. The	e static pressure me	asured at
10 ¹⁰ 10 ¹ 10 ¹	10 ³ 1		transducer depth, w extrapolation in the	as derived from Horner plot to a	the CHir phase usin value of 6343.5 kP	ng straight line Pa.





Test Summary Sheet						
Project:	Oskarshamn site investigation	Test type:[1]	С			
Area:	Laxemar	Test no:			1	
Borehole ID:	KLX04	Test start:			040907 22:36	
Test section from - to (m):	660.75-665.75	Responsible for test execution:			Jörg Böhner	
Section diameter, 2·r _w (m):	0.076	Responsible for		Crist	ian Enachescu	
Linear plot Ω and p		test evaluation:		Recovery period		
		Indata		Indata		
6700 KLX04_660.75-665.75_040907_1_Chir_Q_1	r 10	p₀ (kPa) =	6498	indutu		
	P section P P P P P	p _i (kPa) =	-			
6650 -	P below • 8	$p_{\rm p}(kPa) =$	-	p _F (kPa) =	-	
8800	• 7	$O_{(m^{3}/s)} =$	-	P1 ()		
[64]	• - 6 <u>-</u>	$\frac{d_p(m/s)}{tp(s)} =$	-	t⊧(s) =	-	
9 88 85 85 85 85 85 85 85 85 85 85 85 85	step = 5	Sel S [*] (₋)=	1.00E-06	S el S [*] (_)=	1.00E-06	
		5 er 3 (-)= FC (mS/m)=	1.002.00	3 el 3 (- <i>)</i> -	1.002.00	
8 6500		$Temp_{u}(ar C) =$	17.3			
	• 3	Derivative fact =	-	Derivative fact =	-	
6450	2 ²					
	- 1 - 1					
6400	0.50 0.60 0.70 0.80 0.90 1.00	Results		Results		
Elaps	ted Time [h]	$\Omega/s (m^2/s) =$	NA	lioouno		
Log-Log plot incl. derivates- fl	ow period	T_{11} (m ² /s)=	NA			
		Flow regime:	transient	Flow regime:	transient	
		dt_4 (min) =	-	dt_1 (min) =	-	
		dt_2 (min) =	-	dt_2 (min) =	-	
		$T(m^2/c) =$	NA	$T_{m}(m^{2}/c) =$	NA	
		S(-) =	NA	S(-) =	NA	
		$K_{c}(m/s) =$	NA	$K_{c}(m/s) =$	NA	
Not Ar	nalvsed	$S_{s}(1/m) =$	NA	$S_{s}(1/m) =$	NA	
110171	larysea	$C_{\rm m}^{3}/Pa) =$	NA	$C_{\rm m}^{3}/Pa) =$	NA	
		$C(m/na) = C_{D}(-) =$	NA	$C_{D}(-) =$	NA	
		۲ (-) =	NA	ε (-) =	NA	
		() ~		()		
		$T_{opr}(m^2/s) =$		$T_{ops}(m^2/s) =$		
		$S_{GRF}(-) =$		$S_{GRF}(-) =$		
		$D_{GRF}(-) =$		$D_{GRF}(-) =$		
Log-Log plot incl. derivatives-	recovery period	Selected represe	entative param	neters.		
		dt_1 (min) =	-	C (m ³ /Pa) =	NA	
		dt_2 (min) =	-	$C_{D}(-) =$	NA	
		$T_{T}(m^{2}/s) =$	NA	ξ(-) =	NA	
	S (-) =	NA				
Not Analysed		$K_s(m/s) =$	NA			
		S _s (1/m) =	NA			
	Comments:					
	Based on the test re	sponse (prolong	ed packer complian	ce) the interval		
		transmissivity is low	ver than 1E-11 r	m2/s.		
		No further analysis	recommended.			

Test Summary Sheet						
Project:	Oskarshamn site investigatior	Test type:[1]			Chir	
Area:	Laxema	r Test no:			1	
Borehole ID:	KLX04	Test start:			040908 00:22	
Test section from - to (m):	665.76-670.76	Responsible for test execution:			Jörg Böhner	
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for		Cristi	an Enachescu	
Linear plot Q and p		Flow period		Recovery period		
		Indata		Indata		
6800	KLX04_665.76-670.76_040908_1_Chir_Q_r	p ₀ (kPa) =	6546			
6750 -	0.18	p _i (kPa) =	6540			
6700 -	P section	p _p (kPa) =	6742	p _F (kPa) =	6541	
	P below 0.14	$Q_{p} (m^{3}/s) =$	1.63E-06			
हु 6650 - ट्र	0.12 g	tp (s) =	19.8	t _F (s) =	1200	
2 6600	0.10	S el S [*] (-)=	1.00E-06	S el S [*] (-)=	1.00E-06	
000 0550	10.00 - 0.00	EC _w (mS/m)=				
		Temp _w (gr C)=	17.4			
6500	0.04	Derivative fact.=	0.04	Derivative fact.=	0.02	
6450 -	- 0.02	ļ				
6400 0.50 1.00	0.00 1.50 2.00	Results		Results		
Elapse	d Time [h]	Q/s (m ² /s)=	7.9E-08			
Log-Log plot incl. derivates- f	low period	T_{M} (m ² /s)=	6.5E-08			
		Flow regime:	transient	Flow regime:	transient	
Elapsed time (t	j o i	dt ₁ (min) =	4.68	dt ₁ (min) =	0.60	
10 ² SKB Laxemar / KLX 04 665.76 - 670.76 / Ch	FlowDim Version 2.14b (c) Golder Associates	dt ₂ (min) =	10.87	dt ₂ (min) =	17.11	
		T (m²/s) =	9.2E-08	T (m²/s) =	1.9E-07	
	30	S (-) =	1.0E-06	S (-) =	1.0E-06	
10 1		$K_{s}(m/s) =$	1.8E-08	K _s (m/s) =	3.7E-08	
		S _s (1/m) =	2.0E-07	S _s (1/m) =	2.0E-07	
241) (244)	3 by:	C (m ³ /Pa) =	NA	C (m³/Pa) =	2.1E-11	
10 0		C _D (-) =	NA	C _D (-) =	2.3E-03	
		ξ(-) =	1.3	ξ(-) =	8.0	
	0.3			0		
10.4 10.5 ID	10 ⁶ 10 ⁷ 10 ⁸	$T_{GRF}(m^2/s) =$		$T_{GRF}(m^2/s) =$		
		$S_{GRF}(-) =$		$S_{GRF}(-) =$		
		$D_{GRF}(-) =$		$D_{GRF}(-) =$		
Log-Log plot Incl. derivatives	· recovery period	Selected represe		ieters.		
		$dt_1(min) =$	0.60	C (m) Pa) =	2.1E-11	
10 ² Elapsed time [h	J 10, ^{_1} 10, ⁰	$T_{12}(1111) =$		CD(-) =	2.3⊏-03 ⊙ ∩	
SKB Laxemar / KLX 04 665.76 - 670.76 / Chir	FlowDim Version 2.14b (c) Golder Associates	$I_{T}(m^{-}/s) =$	1.9E-07	ς(-) =	8.0	
	300	S(-) = K(m/s) = -	1.0L-00			
10 1		$R_{s}(11/s) =$	3.7 L-00 2.0E-07			
	10 ²	Comments:	2.00-07			
		The recommended t	transmissivity of	f 1 9E-7 m2/s was de	prived from the	
		analysis of the CHin	phase, which s	hows the best data an	nd derivative	
	10 ¹	quality. The confide	ence range for th	e interval transmissi	vity is	
	a second and a second a second a second a second a second a second a second a second a second a second a second	estimated to be 8.01	E-8 to 5.0E-7 m2	2/s. The flow dimens	ion displayed	
	3	auring the test is 2.	i ne static press e CHir phase us	ure measured at trans	saucer depth, apolation in the	
10 ¹ 10 ² to/cc	10 ³ 10 ⁴ 10 ⁶	Horner plot to a val	ue of 6538.0 kP	a.	apolation in the	



Test Summary Sheet						
Project:	Oskarshamn site investigation	Test type:[1]			Pi	
Area:	Laxemar	Test no:			1	
Borehole ID:	KLX04	Test start:			040908 14:10	
Test section from - to (m):	675.77-680.77 m	Responsible for test execution:			Jörg Böhner	
Section diameter, $2 \cdot r_w$ (m):	0.076	Responsible for		Cristi	an Enachescu	
Linear plot Q and p		Flow period		Recovery period		
6900	0.10	Indata		Indata		
KLX04_675.77-680.77_040908_1_Pi_Q_r	- 0.09	p ₀ (kPa) =	6646			
6850 -	P section Pabove	p _i (kPa) =	6648			
6800 -		p _p (kPa) =	6861	p _F (kPa) =	6651	
	0.07	Q _p (m ³ /s)=	-			
(e 6/20 - 6/20	+ 0.06 g	tp (s) =	-	t _F (s) =	1800	
6700 -	- 0.05 H	S el S [*] (-)=	1.00E-06	S el S [*] (-)=	1.00E-06	
A 6650	0.04	EC _w (mS/m)=				
•	- 0.03	Temp _w (gr C)=	17.6			
6600	0.02	Derivative fact.=	-	Derivative fact.=	0.04	
6550 -	• • 0.01					
0.00 0.20 0.40 0.60 Elapse	0.80 1.00 1.20 1.40 1.60 ad Time [h]	Results		Results		
		Q/s (m ² /s)=	NA			
Log-Log plot incl. derivates- f	low period	T _M (m²/s)=	NA			
		Flow regime:	transient	Flow regime:	transient	
		dt ₁ (min) =	-	dt ₁ (min) =	0.65	
		dt_2 (min) =	-	dt ₂ (min) =	6.93	
		T (m²/s) =	NA	T (m²/s) =	2.7E-10	
		S (-) =	NA	S (-) =	1.0E-06	
		$K_s (m/s) =$	NA	$K_s (m/s) =$	5.4E-11	
Not At	nalysed	$S_{s}(1/m) =$	NA	S _s (1/m) =	2.0E-07	
		C (m³/Pa) =	NA	C (m³/Pa) =	8.4E-12	
		$C_D(-) =$	NA	C _D (-) =	9.3E-04	
		ξ(-) =	NA	ξ(-) =	3.8	
		2		0		
		$T_{GRF}(m^2/s) =$		$T_{GRF}(m^2/s) =$		
		$S_{GRF}(-) =$		$S_{GRF}(-) =$		
		$D_{GRF}(-) =$		$D_{GRF}(-) =$		
Log-Log plot incl. derivatives-	recovery period	dt (min) -	entative paran		9.4F 10	
		$dt_1(min) =$	0.00	C (m°/Pa) =	0.4E-12	
10 ⁻⁴	· · · · · 10 ⁻¹ · · · · · · 10 ⁰	$dt_2(mm) =$	0.93 2 7E-10	$C_{\rm D}(-) =$	3.3⊑-04 3.8	
• • • •	FlowDim Version 2.14b (c) Golder Associates	$I_{T}(m/s) =$	2.7E-10	ς(-) -	5.0	
	0.03	K (m/s) =	5.4E-11			
10 ⁴		$S_{s}(1/m) =$	0.4E-11 2.0E-07			
		Comments:	2.02 07		L	
<u>ଟ</u>	• • • • • • • • • • • • • • • • • • •	The recommended t	transmissivity of	$^{2}2.7\text{E}-10 \text{ m}^{2}/\text{s}$ was o	lerived from the	
10 -1		analysis of the Pi pl	nase. The confid	ence range for the ir	nterval	
	10 -3	transmissivity is est	imated to be 8.0	E-11 to 6.0E-10 m2	/s. It should be	
	3E-4	noted that due to the	e very low interv	al transmissivity the	e results are	
10 3 40 4	10 ⁵ 10 ⁶ 40 ⁷	static pressure could	d be derived.	uispiayeu during th	e lest is 2. No	
טי מו	10 10					

Test Summary Sheet						
Project:	Oskarshamn site invest	igation	Test type:[1]			Pi
Area:	La	axemar	Test no:			1
Borehole ID:		KLX04	Test start:			040908 16:18
Test section from - to (m):	680.78-68	5.78 m	Responsible for test execution:		Jörg Böhner	
Section diameter, 2·r _w (m):		0.076	Responsible for test evaluation:		Cristi	an Enachescu
Linear plot Q and p			Flow period		Recovery period	
8950	8	T 0.20	Indata		Indata	
KLX04_680.78-685.78_040908_1_Pi_Q_r		0.18	p ₀ (kPa) =	6695		
6900 -	P section P above	0.10	p _i (kPa) =	6703		
		+ 0.16	p _p (kPa) =	6915	p _F (kPa) =	6703
6850 -	11	- 0.14	Q _p (m ³ /s)=	-		
동 왕 일 6800 -		0.12 T	tp (s) =	-	t _F (s) =	1800
le Press		0.10 Bate 0.10 U	S el S [*] (-)=	1.00E-06	S el S [*] (-)=	1.00E-06
6750 G		uject 10000 -	EC _w (mS/m)=			
6700		0.06	Temp _w (gr C)=	17.7		
		0.04	Derivative fact.=	-	Derivative fact.=	0.11
6650		0.02				
0.00 0.20 0.40 0.60 Elapse	0.80 1.00 1.20	1.40	Results		Results	
			Q/s (m²/s)=	NA		
Log-Log plot incl. derivates- fl	ow period		T _M (m²/s)=	NA		
			Flow regime:	transient	Flow regime:	transient
			dt ₁ (min) =	-	dt ₁ (min) =	0.56
			dt ₂ (min) =	-	dt ₂ (min) =	5.20
			T (m²/s) =	NA	T (m²/s) =	3.1E-09
			S (-) =	NA	S (-) =	1.0E-06
			K _s (m/s) =	NA	K _s (m/s) =	6.2E-10
Not Ar	nalysed		S _s (1/m) =	NA	S _s (1/m) =	2.0E-07
			C (m³/Pa) =	NA	C (m³/Pa) =	2.3E-11
			C _D (-) =	NA	C _D (-) =	2.6E-03
			ξ(-) =	NA	ξ(-) =	6.1
			T _{GRF} (m²/s) =		T _{GRF} (m²/s) =	
			S _{GRF} (-) =		S _{GRF} (-) =	
			D _{GRF} (-) =		D _{GRF} (-) =	
Log-Log plot incl. derivatives-	recovery period		Selected represe	intative param	eters.	
			$dt_1(min) =$	0.56	C (m³/Pa) =	2.3E-11
Elapsed time (h	ŋ 10, ⁻¹ 10, ⁰		$dt_2 (min) =$	5.20	$C_{\rm D}(-) =$	2.6E-03
SKB Laxemar / KLX 04 680.78 - 685.78 / Pi	FlowDim Version 2.14t (c) Golder Associates	b -	$T_T (m^2/s) =$	3.1E-09	ξ(-) =	6.1
			S (-) =	1.0E-06		
10 1			$K_s (M/s) =$	6.2E-10		
		10 -2	$S_s(1/m) =$	2.0E-07		l
8: 10 °	100 m and a second second	and pressure			2 1E 0 2/a a da	winned from the
		nporuosed	analysis of the Pi ph	transmissivity of pase. Considerin	s.1E-9 m2/s was at	tainties related
10-1			to the measurement	(e.g. specially the	he measurement of t	he wellbore
			storage coefficient)	and to the analy	sis process (e.g. nun	neric distortion
		10 *	when calculating the	e derivative and	pressure history effe	ects), the $5E_{10}$ to $5E_{20}$
10 ⁶ 10 ⁷ 10	10 ⁰ 10 ⁰ 10	0 10	9 m2/s. The flow di	mension display	red during the test is	2. No static
			pressure could be d	erived.		
Borehole: KLX04

APPENDIX 4

Nomenclature

Borehole: KLX04	Page 4/2

The following symbols are extracted from the more comprehensive list of symbols provided by SKB. Only the symbols that were used or deemed to be used in the future in the context of test analysis are presented.

Character	Explanation	Dimension	Unit
b	Aquifer thickness (Thickness of 2D formation)	[L]	m
L _w	Test section length.	[L]	m
r _w	Borehole, well or soil pipe radius in test section.	[L]	m
r _D	Dimensionless radius, $r_D = r/r_w$	-	-
Qp	Flow in test section immediately before stop of flow. Stabilised	$[L^3/T]$	m^3/s
-1	pump flow in flow logging.		
Qm	Arithmetical mean flow during perturbation phase.	$[L^3/T]$	m ³ /s
V	Volume	[L ³]	m ³
V _w	Water volume in test section.	[L ³]	m ³
V _p	Total water volume injected/pumped during perturbation	[L ³]	m ³
•	phase.		
t	Time	[T]	hour,min,s
t ₀	Duration of rest phase before perturbation phase.	[T]	S
t _p	Duration of perturbation phase. (from flow start as far as p _p).	[T]	S
t _F	Duration of recovery phase (from p_p to p_F).	[T]	S
t_1, t_2 etc	Times for various phases during a hydro test.	[T]	hour,min,s
dt	Running time from start of flow phase and recovery phase	[T]	S
	respectively.		
dt _e	$dt_e = (dt \cdot tp) / (dt + tp)$ Agarwal equivalent time with dt as	[T]	S
	running time for recovery phase.		
t _D	$t_{\rm D} = T \cdot t / (S \cdot r_{\rm w}^2)$. Dimensionless time	-	-
р	Static pressure; including non-dynamic pressure which	$[M/(LT)^2]$	kPa
	depends on water velocity. Dynamic pressure is normally		
	ignored in estimating the potential in groundwater flow		
	relations.		
pa	Atmospheric pressure	$[M/(LT)^2]$	kPa
pt	Absolute pressure; $p_t=p_a+p_g$	$[M/(LT)^2]$	kPa
pg	Gauge pressure; Difference between absolute pressure and	$[M/(LT)^2]$	kPa
	atmospheric pressure.		
\mathbf{p}_0	Initial pressure before test begins, prior to packer expansion.	$\left[M/(LT)^2 \right]$	kPa
pi	Pressure in measuring section before start of flow.	$[M/(LT)^2]$	kPa
$p_{\rm f}$	Pressure during perturbation phase.	$[M/(LT)^2]$	kPa
p _s	Pressure during recovery.	$[M/(LT)^2]$	kPa
p _p	Pressure in measuring section before flow stop.	$[M/(LT)^2]$	kPa
p _F	Pressure in measuring section at end of recovery.	$[M/(LT)^2]$	kPa
pD	$p_D=2\pi \cdot T \cdot p/(Q \cdot \rho_w g)$, Dimensionless pressure	-	-
dp	Pressure difference, drawdown of pressure surface between	$[M/(LT)^2]$	kPa
_	two points of time.	22	4 -
dp _f	$dp_f = p_i - p_f$ or $p_f = p_f - p_i$, drawdown/pressure increase of	$[M/(LT)^2]$	kPa
	pressure surface between two points of time during		
1	perturbation phase. dp _f usually expressed positive.		1.5
dps	$dp_s = p_s - p_p$ or $p_p - p_s$, pressure increase/drawdown of	$[M/(LT)^2]$	kPa
	pressure surface between two points of time during recovery		
due	phase. dp_s usually expressed positive.	$\Gamma M/(\Gamma T)^{2}$	1-De
ap _p	$ap_p = p_i - p_p$ or $p_p - p_i$, maximal pressure increase/drawdown	[M/(L1) ⁻]	кРа
	of pressure surface between two points of time during		
da	perturbation phase. dp_p expressed positive.	$[\mathbf{M}/(\mathbf{I} \mathbf{T})^2]$	l-Do
up _F	$\mu p_F - p_p - p_F$ or $= p_F - p_p$, maximal pressure increase/drawdown of pressure surface between two points of	[[MI/(L-1)]]	кра
	time during recovery phase dp. expressed positive		
	μ multiplicative phase. μ expressed positive.		

Borehole: KLX04	Page 4/3

Н	Total head; (potential relative a reference level) (indication of h for phase as for p) $H=h + h + h$	[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) $h=h+h$	[L]	m
h _e	Height of measuring point (Elevation head); Level above reference level for measuring point.	[L]	m
Sn	Drawdown in measuring section before flow stop.	[L]	m
h ₀	Initial above reference level before test begins, prior to packer expansion.	[L]	m
h _i	Level above reference level in measuring section before start of flow.	[L]	m
h _f	Level above reference level during perturbation phase.	[L]	m
h _s	Level above reference level during recovery phase.	[L]	m
h _p	Level above reference level in measuring section before flow stop.	[L]	m
$h_{\rm F}$	Level above reference level in measuring section at end of recovery.	[L]	m
dh	Level difference, drawdown of water level between two points of time.	[L]	m
dh _f	$dh_f = h_i - h_f$ or $= h_f - h_i$, drawdown/pressure increase of pressure surface between two points of time during perturbation phase. dh_f usually expressed positive.	[L]	m
dh _s	$dh_s = h_s - h_p$ or $= h_p - h_s$, pressure increase/drawdown of pressure surface between two points of time during recovery phase. dh_s usually expressed positive.	[L]	m
dh _p	$dh_p = h_i - h_p$ or $= h_p - h_i$, maximal pressure increase/drawdown of pressure surface between two points of time during perturbation phase. dh_p expressed positive.	[L]	m
dh _F	$dh_F = h_p - h_F$ or $= h_F - h_p$, maximal pressure increase/drawdown of pressure surface between two points of time during perturbation phase. dh_F expressed positive.	[L]	m
Te _w	Temperature in the test section (taken from temperature logging). Temperature		°C
Te _{w0}	Temperature in the test section during undisturbed conditions (taken from temperature logging). Temperature		°C
g	Constant of gravitation (9.81 m*s ⁻²) (Acceleration due to gravity)	$[L/T^2]$	m/s ²
π	Constant (approx 3.1416).	[-]	
r	Residual. $r = p_c - p_m$, $r = h_c - h_m$, etc. Difference between		
	measured data (p_m , h_m , etc) and estimated data (p_c , h_c , etc)	FT 2 (D)	2,
Q/s	Specific capacity $s=dp_p$ or $s=s_p=h_0-h_p$ (open borehole)	[L ⁻ /1]	m ⁻ /s
D	Interpreted flow dimension according to Barker, 1988.	[-]	-
dt ₁	characteristic counted from start of flow phase and recovery phase respectively.	[1]	S
dt ₂	End of time for semi-log or log-log evaluated characteristic counted from start of flow phase and recovery phase respectively.	[T]	S
Т	Transmissivity	$[L^2/T]$	m^2/s
T _M	Transmissivity according to Moye (1967)	$[L^2/T]$	m^2/s
Ts	Transmissivity evaluated from slug test	$[L^2/T]$	m^2/s
T _{Sf} , T _{Lf}	Transient evaluation based on semi-log or log-log diagram for perturbation phase in injection or pumping.	$[L^2/T]$	m ² /s
T_{Ss}, T_{Ls}	Transient evaluation based on semi-log or log-log diagram for recovery phase in injection or pumping.	$[L^2/T]$	m^2/s

Borehole: KLX04	Page 4/4

T _T	Transient evaluation (log-log or lin-log). Judged best	$[L^2/T]$	m^2/s
	evaluation of T_{Sf} , T_{Lf} , T_{Ss} , T_{Ls}		
T _{NLR}	Evaluation based on non-linear regression.	$[L^2/T]$	m^2/s
S	Storage coefficient, (Storativity)	[-]	-
S*	Assumed storage coefficient	[-]	-
S_{f}	Fracture storage coefficient	[-]	-
Sm	Matrix storage coefficient	[-]	-
S _{NLR}	Storage coefficient, evaluation based on non-linear regression	[-]	-
Ss	Specific storage coefficient; confined storage.	[1/L]	1/m
S _s *	Assumed specific storage coefficient; confined storage.	[1/L]	1/m
ξ	Skin factor	[-]	-
٤*	Assumed skin factor	[-]	-
Č	Wellbore storage coefficient	$[(LT^2) \cdot M^2]$	m ³ /Pa
C _D	$C_D = C \cdot \rho_w g / (2\pi \cdot S \cdot r_w^2)$, Dimensionless wellbore storage	[-]	-
	coefficient		
ω	$\omega = S_f / (S_f + S_m)$, storage ratio (Storativity ratio); the ratio of	[-]	-
	storage coefficient between that of the fracture and total		
	storage.		
λ	$\lambda = \alpha \cdot (K_m / K_f) \cdot r_w^2$ interporosity flow coefficient.	[-]	-
T _{GRF}	Transmissivity interpreted using the GRF method	$[L^2/T]$	m^2/s
S _{GRF}	Storage coefficient interpreted using the GRF method	[1/L]	1/m
D _{GRF}	Flow dimension interpreted using the GRF method	[-]	-
c _w	Water compressibility; corresponding to β in hydrogeological	$[(LT^2)/M]$	1/Pa
	literature.		
c _r	Pore-volume compressibility, (rock compressibility);	$[(LT^2)/M]$	1/Pa
	Corresponding to α/n in hydrogeological literature.		
\mathbf{c}_{t}	$c_t = c_r + c_w$, total compressibility; compressibility per	$[(LT^2)/M]$	1/Pa
	volumetric unit of rock obtained through multiplying by the		
	total porosity, n. (Presence of gas or other fluids can be		
	included in ct if the degree of saturation (volume of respective		
	fluid divided by n) of the pore system of respective fluid is also		
	included)		
n	Total porosity	-	-
ρ	Density	$[M/L^3]$	kg/(m ²)
ρ_{w}	Fluid density in measurement section during pumping/injection	$[M/L^3]$	kg/(m ³)
μ	Dynamic viscosity	[M/LT]	Pa s
$\mu_{\rm w}$	Dynamic viscosity (Fluid density in measurement section	[M/LT]	Pa s
	during pumping/injection)		

									(Simp	lified version v1.2)		
2 2 2 2 3			ICAL	A/Da	ta Im	port Te	empla	te				
									SKB &	Ergodata AB 2004		
File Identity												
Created By		Reinder van der Wall										
Created		2004-10-07 16:14										
A officity, Turno		KL X04				, ocion		AP PS 4	00-04-75			
		KLX04 - Injection t	est									
Activity Informa	tion					Additional Acti	vitv Data					
							P20	P200	P220	R110	R25	R90
ldcode	Start Date	Stop Date	Secup (m)	Seclow (m)	Section No	Company	Field crew manager	Field crew	Person evaluating data	Field Notes ID	Report	Quality plan
							Nils Rahm,	Nils Rahm, Jörg Böhner, Stephan Rohs				
							Jörg Böhner, Stephan	Tomas Cronquist, Karsten Ebeling,	Cristian Enachescu, Jörg Böhner,			
KLX04	2004-08-17 09:00	2004-09-08 19:00	105,11	986,11		Golder	Rohs	Matthäus Zieger	Stephan Rohs			

KLX04

KLX04

rsion) tion for the creation of new activities of a certain type (activity type), along with	latabase. this template is intended for is included at the top of this worksheet.	orner have a description associated with it. Either select or move the mouse over the		on in the columns locode, start Date, stop Date, secup, sectow and section ruo. for each created activity. Please enter the appropriate activity attributes for each	included in this file is choosen when this file is generated from SICADA.		activity can be supplied. Each data table has its own worksheet in this Excel workbook.	ed in this file is choosen when this file is generated from SICADA. The pre-filled set of altered to an exception that this file can be immorted to SICADA when completed	airered to guarance that this he can be imported to oronoon when compresso. n activity. The connection is done by supplying values for idcode, start_date,	ch data row. It is convenient to copy these values from the corresponding activity	an be found in the respective worksheet.
ADA Data Import Template (simplified ver s template should be used to supply informati	ociated measurement data, in the SICADA da irmation about the selected activity type that t	is that have a red marker in its upper right cor to see the text.	e Activity Data Sheet	each activity to be created, supply initiatio ditional activity attributes should be provided fi	ivity with appropriate information. s selected set of additional activity attributes ir	e Data Table Sheet(s)	asurement data associated to each created a	e selected set of tables (and columns) include	ch entered data row must be connected to an	p_date, secup, seclow and section_no on eac	ormation about each table and its columns car

idcode

List of idcodes and possibly other check values follows below - please do NOT edit.

plu_s_hole_test_d	PLU Injection and pumping, General information	
Table		

	D-4-4	1-1	Coloure Description
Column	Datatype	UNIT	
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	E	Upper section limit (m)
sectow	FLOAT	E	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	yyyy mmdd	Date & time of pumping/injection stop (YYYY-MM-DD hh:mm:ss)
mean_flow_rate_qm	FLOAT	m**3/s	Arithmetic mean flow rate of the pumping/injection
flow_rate_end_qp	FLOAT	m**3/s	Flow rate at the end of the flowing period
value_type_qp	CHAR		0:true value,-1 <lower meas.limit1:="">upper meas.limit</lower>
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(positive) or injected(negative) water
dur_flow_phase_tp	FLOAT	S	Time for the flowing phase of the test
dur_rec_phase_tf	FLOAT	S	Time for the recovery phase of the test
initial_head_hi	FLOAT	E	Initial formation head, see table description
head_at_flow_end_h	IFLOAT	ε	Hydraulic head at end of flow phase, see table description
final_head_hf	FLOAT	E	Hydraulic head at end of recovery phase, see table descript.
initial_press_pi	FLOAT	кРа	Initial formation pressure. Actual formation pressure
press_at_flow_end_f	DFLOAT	kPa	Pressure at the end of flow phase, see table description.
final_press_pf	FLOAT	kPa	Final pressure at the end of the recovery, see table descr.
fluid_temp_tew	FLOAT	oC	Section fluid temperature, see table description
fluid_elcond_ecw	FLOAT	mS/m	Section fluid el. conduvtivity, see table description
fluid_salinity_tdsw	FLOAT	mg/l	Total salinity of section fluid based on EC, see table descr.
fluid_salinity_tdswm	FLOAT	mg/l	Tot. section fluid salinity based on water sampling, see
reference	CHAR		SKB report No for reports describing data and evaluation
comments	VARCHAR		Short comment to data
error_flag	CHAR		If error_flag = "*" then an error occured and an error
in_use	CHAR		If in_use = "*" then the activity has been selected as
sign	CHAR		Signature for QA data accknowledge (QA - OK)
þ	FLOAT	ш	Hydraulic point of application

						fo	ormation_t			mean_flow_	flow_rate_e value_ty	d_measl	tot_volume_
idcode	start_date	stop_date	secup	seclow sec	ction_no te	st_type y	pe st	art_flow_period	stop_flow_period	rate_qm	nd_qp pe_qp	<u>q_measll u</u>	vp 2,17,01
KLX04	2004-08-20 10:27:00	2004-08-20 12:44:00	105,11	205,11	<u>, 0</u>			2004-08-20 11:42:26	2004-08-20 12:12:41	1,/4E-04	1,68E-04 0	1,666/E-08 8,3333E-04	3,14E-01
KLX04	2004-08-20 16:11:00	2004-08-20 17:40:00 2004 08 24 10:32:00	205,34	305,34	<u>, v</u>			2004-08-20 16:58:23	2004-08-20 17:28:38	4,93E-04	4,60E-04 0 1 64E 04 0	1,666/E-08 8,3333E-04	1,13E+00 3 10E 01
KLX04	2004-00-21 00.14.00	2004-08-21 10.33.00	105,40	403,4 I	<u>יי</u> מ			2004-00-21 09.30.33	2004-08-21 10:01:12	1,7 ZE-04 8 76E-06	1,04E-04 0 8.41E-06 0	1,000/E-00 0,3333E-04 1.6667E-08 8.3333E-04	3, IUE-U I
KI X04	2004-00-21 11:40:00	2004-08-21 15:37:00	505.55	605.55	0 00			2004-00-21 12:J0:UJ	2004-00-21 15:20:23	6.18E-05	5 78F-05 0	1,6667E-08 8,3333E-04	1 11E-01
KLX04	2004-08-22 08:12:00	2004-08-22 10:00:00	605,69	705,69	<u>0</u>	· -		2004-08-22 09:03:35	2004-08-22 09:33:53	4,78E-05	4,60E-05 0	1,6667E-08 8,3333E-04	8,60E-02
KLX04	2004-08-22 11:37:00	2004-08-22 13:58:00	705,81	805,81	4	1		2004.08.22 12;24:16	2004-08-22 12:24:36	-	1	1,6667E-08 8,3333E-04	-
KLX04	2004-08-22 15:17:00	2004-08-22 17:25:00	805,98	905,98	3	~		2004-08-22 16:08:56	2004-08-22 16:54:23	1,01E-06	8,57E-07 0	1,6667E-08 8,3333E-04	2,73E-03
KLX04	2004-08-23 08:00:00	2004-08-23 09:51:00	886,11	986,11	3	1		2004-08-23 08:49:50	2004-08-23 09:20:11	1,50E-05	1,49E-05 0	1,6667E-08 8,3333E-04	2,69E-02
KLX04	2004-08-24 07:29:00	2004-08-24 08:56:00	105,21	125,21	3	~		2004-08-24 08:14:56	2004-08-24 08:35:12	5,23E-05	5,00E-05 0	1,6667E-08 8,3333E-04	6,28E-02
KLX04	2004-08-24 09:54:00	2004-08-24 11:20:00	125,25	145,25	З	~		2004-08-24 10:38:02	2004-08-24 10:58:26	3,13E-06	3,05E-06 0	1,6667E-08 8,3333E-04	3,76E-03
KLX04	2004-08-24 21:02:00	2004-08-24 22:45:00	145,30	165,30	3	~		2004-08-24 22:03:09	2004-08-24 22:23:32	8,02E-07	7,20E-07 0	1,6667E-08 8,3333E-04	9,62E-04
KLX04	2004-08-24 23:44:00	2004-08-25 01:17:00	165,30	185,30	3	~		2004-08-25 00:35:37	2004-08-25 00:55:55	9,70E-06	8,97E-06 0	1,6667E-08 8,3333E-04	1,16E-02
KLX04	2004-08-25 06:35:00	2004-08-25 08:06:00	185,32	205,32	Э	~		2004-08-25 07:24:25	2004-08-25 07:44:44	1,05E-04	9,69E-05 0	1,6667E-08 8,3333E-04	1,25E-01
KLX04	2004-08-25 08:49:00	2004-08-25 10:25:00	205,34	225,34	3	1		2004-08-25 09:44:02	2004-08-25 10:04:17	4,84E-04	4,67E-04 0	1,6667E-08 8,3333E-04	5,80E-01
KLX04	2004-08-30 05:53:00	2004-08-30 07:04:00	225,35	245,35	3	1		2004-08-30 06:32:00	2004-08-30 06:52:23	1,58E-05	1,37E-05 0	1,6667E-08 8,3333E-04	1,89E-02
KLX04	2004-08-30 07:53:00	2004-08-30 09:17:00	245,38	265,38	3	1		2004-08-30 08:34:57	2004-08-30 08:55:15	2,85E-04	2,73E-04 0	1,6667E-08 8,3333E-04	3,42E-01
KLX04	2004-08-30 09:53:00	2004-08-30 10:59:00	265,38	285,38	3	~		2004-08-30 10:29:15	2004-08-30 10:49:28	9,62E-06	9,17E-06 0	1,6667E-08 8,3333E-04	1,15E-02
KLX04	2004-08-25 22:12:00	2004-08-26 01:14:00	285,40	305,40	e	-		2004-08-26 00:26:00	2004-08-26 00:52:20	4,60E-04	4,12E-04 0	1,6667E-08 8,3333E-04	7,18E-01
KLX04	2004-08-26 02:27:00	2004-08-26 03:59:00	305,41	325,41	e	-		2004-08-26 03:21:52	2004-08-26 03:42:12	6,27E-06	5,80E-06 0	1,6667E-08 8,3333E-04	7,52E-03
KLX04	2004-08-26 06:30:00	2004-08-26 07:55:00	325,44	345,44	3	~		2004-08-26 07:18:17	2004-08-26 07:38:44	3,52E-06	2,43E-06 0	1,6667E-08 8,3333E-04	4,22E-03
KLX04	2004-08-26 08:37:00	2004-08-26 09:59:00	345,44	365,44	Э	~		2004-08-26 09:17:04	2004-08-26 09:37:29	1,63E-04	1,56E-04 0	1,6667E-08 8,3333E-04	1,95E-01
KLX04	2004-08-26 10:38:00	2004-08-26 12:11:00	365,47	385,47	3	1		2004-08-26 11:29:44	2004-08-26 11:50:06	7,25E-06	6,80E-06 0	1,6667E-08 8,3333E-04	8,70E-03
KLX04	2004-08-26 14:00:00	2004-08-26 15:52:00	385,47	405,47	Э	~		2004-08-26 15:10:51	2004-08-26 15:31:20	1,28E-07	1,07E-07 0	1,6667E-08 8,3333E-04	1,54E-04
KLX04	2004-08-26 16:37:00	2004-08-26 18:31:00	405,49	425,49	3	~		2004-08-26 17:49:03	2004-08-26 18:09:22	7,33E-06	7,17E-06 0	1,6667E-08 8,3333E-04	8,80E-03
KLX04	2004-08-26 19:32:00	2004-08-26 17:56:00	425,51	445,51	3	~		2004-08-26 20:20:37	2004-08-26 20:41:00	1,13E-06	1,00E-06 0	1,6667E-08 8,3333E-04	1,36E-03
KLX04	2004-08-30 16:11:00	2004-08-30 17:46:00	445,50	465,50	e	-		2004-08-30 16:49:39	2004-08-30 17:09:58	7,27E-08	5,23E-08 0	1,6667E-08 8,3333E-04	8,72E-05
KLX04	2004-08-27 00:32:00	2004-08-27 02:22:00	465,52	485,52	e	-		2004-08-27 01:39:56	2004-08-27 02:00:23	6,50E-07	5,33E-07 0	1,6667E-08 8,3333E-04	7,80E-04
KLX04	2004-08-27 06:38:00	2004-08-27 08:29:00	485,52	505,52	4	~		2004-08-27 07:26:53			-	1,6667E-08 8,3333E-04	1
KLX04	2004-08-27 09:11:00	2004-08-27 10:42:00	505,55	525,55	<u>е</u>	<u> </u>		2004-08-27 10:00:59	2004-08-27 10:21:18	3,21E-05	3,08E-05 0	1,6667E-08 8,3333E-04	3,85E-02
KLX04	2004-08-27 11:14:00	2004-08-27 14:13:00	525,58	545,58	4	~		2004-08-27 13:11:31	2004-08-27 13:11:41	1	-	1,6667E-08 8,3333E-04	1
KLX04	2004-08-27 19:34:00	2004-08-27 20:42:00	545,62	565,62	3	~		2004-08-27 19:50:18	2004-08-27 20:10:51	7,63E-08	5,72E-08 0	1,6667E-08 8,3333E-04	9,16E-05
KLX04	2004-08-27 21:41:00	2004-08-27 23:14:00	565,64	585,64	3	-		2004-08-27 22:42:05	2004-08-27 23:02:29	1,06E-05	1,00E-05 0	1,6667E-08 8,3333E-04	1,27E-02
KLX04	2004-08-28 00:07:00	2004-08-28 01:30:00	585,65	605,65	3	-		2004-08-28 00:58:22	2004-08-28 01:18:44	2,27E-05	2,07E-05 0	1,6667E-08 8,3333E-04	2,72E-02
KLX04	2004-08-28 02:17:00	2004-08-28 03:46:00	605,69	625,69	e	-		2004-08-28 03:04:45	2004-08-28 03:25:06	3,45E-05	3,28E-05 0	1,6667E-08 8,3333E-04	4,14E-02
KLX04	2004-08-28 06:37:00	2004-08-28 07:58:00	625,71	645,71	0			2004-08-28 07:21:13	2004-08-28 07:41:32	3,30E-05	3,22E-05 0	1,6667E-08 8,3333E-04	3,96E-02
KLX04	2004-08-28 08:45:00	2004-08-28 10:12:00	645,73	665,73	e (- -		2004-08-28 09:25:14	2004-08-28 09:45:44	9,97E-08	8,33E-08 0	1,6667E-08 8,3333E-04	1,20E-04
KLX04	2004-08-28 10:47:00	2004-08-28 12:39:00	665,76	685,76	<u>.</u>	-		2004-08-28 11:27:39	2004-08-28 11:48:03	2,55E-06	1,68E-06 0	1,6667E-08 8,3333E-04	3,06E-03
KLX04	2004-08-28 13:37:00	2004-08-28 17:56:00	685,79	705,79	4			2004-08-28 14:31:35	2004-08-28 14:53:16	'		1,6667E-08 8,3333E-04	'
KLX04	2004-08-28 17:59:00	2004-08-28 19:02:00	805,98	825,98				-		-		1,666/E-08 8,3333E-04	'
KLX04	2004-08-28 20:06:00	2004-08-28 22:06:00	826,02	846,02				2004-08-28 21:03:31	2004-08-28 21:03:46	-		1,666/E-08 8,3333E-04	'
KLX04	2004-06-26 22.30.00	2004-06-29 00:01:00	040,U3 866.08	886 DB	, (*			- 2004-08-20 01-30-00	- 2004-08-20 01-50-38	- 8 37E_07	7 42E_07 0	1,000/E-U0 0,3333E-U4 1 6667E-08 8 3333E-04	- 1 00E-03
KI X04	2004-08-31 01:49:00	2004-08-31 03:53:00	886 11	906 11				2004-08-31 03-11-00	2004-08-31 03-21-22	3.27E-07	2 83E-07 0	1 6667F-08 8 3333F-04	3 92F-04
KLX04	2004-08-31 06:18:00	2004-08-31 07:44:00	906.16	926,16	0 00	- .		2004-08-31 07:02:19	2004-08-31 07:22:27	7.25E-06	6.43E-06 0	1.6667E-08 8.3333E-04	8,70E-03
KI X04	2004-08-31 08:16:00	2004-08-31 09:46:00	926.18	946.18	0	~		2004-08-31 09:04:37	2004-08-31 09:24:45	7.50E-06	6.62E-06 0	1.6667E-08 8.3333E-04	9.00E-03
KLX04	2004-08-31 10:30:00	2004-08-31 12:17:00	943.05	963.05	0 00	· . ·		2004-08-31 11:15:34	2004-08-31 11:35:44	2.95E-06	2.62E-06 0	1.6667E-08 8.3333E-04	3,54E-03
KLX04	2004-08-31 12:54:00	2004-08-31 14:12:00	963,05	983,05	3	~		2004-08-31 13:29:00	2004-08-31 13:50:20	2,03E-06	1,85E-06 0	1,6667E-08 8,3333E-04	2,44E-03
KLX04	2004-09-01 10:29:00	2004-09-01 11:53:00	300,41	305,41	3	~		2004-09-01 11:10:16	2004-09-01 11:30:23	1,29E-06	1,03E-06 0	1,6667E-08 8,3333E-04	1,55E-03
KLX04	2004-09-01 13:06:00	2004-09-01 14:06:00	305,41	310,41	7	-		•	1	'		1,6667E-08 8,3333E-04	•
KLX04	2004-09-01 14:43:00	2004-09-01 15:53:00	310,42	315,42	e	~		2004-09-01 15:21:46	2004-09-01 15:41:56	5,42E-06	5,00E-06 0	1,6667E-08 8,3333E-04	6,50E-03
KLX04	2004-09-01 16:25:00	2004-09-01 18:07:00	315,43	320,43	e	-		2004-09-01 17:35:10	2004-09-01 17:55:31	5,63E-06	5,37E-06 0	1,6667E-08 8,3333E-04	6,75E-03
KLX04	2004-09-01 18:55:00	2004-09-01 20:40:00	320,43	325,43	<u>0</u>			2004-09-01 19:58:52	2004-09-01 20:19:21	3,45E-07	2,72E-07 0	1,6667E-08 8,3333E-04	4,14E-04
KLX04	2004-09-01 23:17:00	2004-09-02 01:02:00	325,44	330,44	<u>., c</u>			2004-09-02 00:35:16	2004-09-02 00:55:31	1,14E-06 4 81E-08	1,10E-06 0	1,6667E-08 8,3333E-04	1,36E-03 5 77E-05
NLAU4	2004-02-02-02-02	2004-02-02 01 20-20	11, UCC	000,44	S	-		ZUU4-U3-UZ UD.Z3.11	ZUU4-U3-UZ U0.43.22	4,0 IE-U0	Z,3UE-U0 U	1,0001 E-U0 0,0000E-U4	0,11E-00

drode	start date	ston date	secino	sectow	section no 1	t tvne	formation_t	start flow period	ston flow period	mean_flow_ rate_cm	flow_rate_e value_ty	q_measl	tot_volume_
<1_X04	2004-09-02 07:47:00	2004-09-02 08:52:00	335.44	340.44			2	2004-09-02 08:25:33	2004-09-02 08:45:38	2.48E-06	2.25E-06 0	1.6667E-08 8.3333E-04	2.98E-03
<pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre>	2004-09-02 09:24:00	2004-09-02 10:30:00	340,44	345,44		m		2004-09-02 10:03:44	2004-09-02 10:23:56	6,56E-07	6,17E-07 0	1,6667E-08 8,3333E-04	7,88E-04
<pre></pre>	2004-09-02 11:09:00	2004-09-02 12:32:00	345,44	350,44		Ň	~	2004-09-02 11:46:21	2004-09-02 12:10:31	3,40E-06	2,97E-06 0	1,6667E-08 8,3333E-04	4,08E-03
KLX04	2004-09-02 13:20:00	2004-09-02 14:50:00	350,45	355,45		Č	-	2004-09-02 14:07:08	2004-09-02 14:27:13	1,35E-04	1,29E-04 0	1,6667E-08 8,3333E-04	1,62E-01
KLX04	2004-09-02 15:14:00	2004-09-02 16:28:00	355,47	360,47		e	-	2004-09-02 15:56:46	2004-09-02 16:16:59	3,15E-05	1,98E-05 0	1,6667E-08 8,3333E-04	3,78E-02
KLX04	2004-09-02 16:57:00	2004-09-02 18:05:00	360,47	365,47			-	2004-09-02 17:33:00	2004-09-02 17:53:20	7,55E-06	7,27E-06 0	1,6667E-08 8,3333E-04	9,06E-03
KLX04	2004-09-02 20:18:00	2004-09-02 21:54:00	365,47	370,47			_	2004-09-02 21:12:00	2004-09-02 21:32:00	2,03E-07	1,83E-07 0	1,6667E-08 8,3333E-04	2,44E-04
XLX04	2004-09-02 ZZ:37:00	2004-09-03 00:16:00	3/0,4/	3/5,4/				2004-09-02 23:39:00	2004-09-02 23:59:20	1,1/E-00	1, U/ E-U0 U	1,000/E-U0 0,3333E-U4	1,41E-U3 6 00E 02
	00.10.00 00.00 00 0000	2004-09-03 0/ :02:00	14,010	300,41				12:00:00 00 00 0000	24-26-00 60-60-4002	0,9/E-00	0,30E-00 0	1,000/E-00 0,3333E-04 1 6667E 00 0,3333E-04	0,095-03
XLX04	2004-09-03-07:31:00	2004-09-03 08:50:00	380,47	385,47		~ ~		2004-09-03 08:08:34	Z004-09-03 08:29:14	3,5/E-U/	3,30E-07 0	1,000/E-U8 8,3333E-U4	4,Z8E-U4
XLX04	2004-00-02-42:20:00	Z004-09-03 11:06:00	385,47	390,47		+ -		Z004-09-03 10:01:00	2004-09-03 10:04:25	4,25E-U5		1,000/E-U8 8,3333E-U4 1 6667E 00 0 2222E 04	•
VLX04	2004-09-03 12:21:00	2004-09-03 13:42:00 2004-09-03 15:43:00	395,48	393,40 400 48	-	+ +	_	2004-09-03 12:39:13	2004-09-03 13:00.10 2004-09-03 15:11:21	4,235-03		1,000/E-00 0,3333E-04 1 6667E-08 8 3333E-04	
KLX04	2004-09-03 16:10:00	2004-09-03 17:50:00	400,48	405.48				2004-09-03 17:07:29	2004-09-03 17:27:59	4.13E-07	3.67E-07 0	1,6667E-08 8.3333E-04	4.96E-04
<pre></pre>	2004-09-03 18:30:00	2004-09-03 20:05:00	405,49	410.49		Č		2004-09-03 19:22:36	2004-09-03 19:43:04	2.05E-07	1.78E-07 0	1.6667E-08 8.3333E-04	2.46E-04
KLX04	2004-09-03 21:22:00	2004-09-03 23:01:00	410,50	415,50		m	-	2004-09-03 22:18:59	2004-09-03 22:39:19	3,83E-08	3,33E-08 0	1,6667E-08 8,3333E-04	4,60E-05
<pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre>	2004-09-03 23:32:00	2004-09-04 01:10:00	415,51	420,51		e	-	2004-09-04 00:27:53	2004-09-04 00:48:13	8,00E-06	7,67E-06 0	1,6667E-08 8,3333E-04	9,60E-03
<pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre>	2004-09-04 06:01:00	2004-09-04 07:25:00	420,51	425,51	,	` 	-	2004-09-04 06:47:14	2004-09-04 06:48:00	•		1,6667E-08 8,3333E-04	
<pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre>	2004-09-04 07:55:00	2004-09-04 09:07:00	425,51	430,51	7		-	2004-09-04 08:34:02	2004-09-04 08:34:35	4,25E-05		1,6667E-08 8,3333E-04	'
<pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre>	2004-09-04 09:37:00	2004-09-04 11:35:00	430,51	435,51		m	-	2004-09-04 10:13:13	2004-09-04 10:33:25	7,17E-08	6,67E-08 0	1,6667E-08 8,3333E-04	8,60E-05
KLX04	2004-09-04 12:31:00	2004-09-04 13:31:00	435,50	440,50			1	-		-	1	1,6667E-08 8,3333E-04	-
KLX04	2004-09-04 14:00:00	2004-09-04 15:07:00	440,50	445,50			1	2004-09-04 14:40:25	2004-09-04 15:00:37	1,10E-06	1,03E-06 0	1,6667E-08 8,3333E-04	1,32E-03
KLX04	2004-09-04 15:38:00	2004-09-04 17:26:00	445,50	450,50	7	•	-	2004-09-04 16:43:31	2004-09-04 16:44:09	1		1,6667E-08 8,3333E-04	1
KLX04	2004-09-04 18:04:00	2004-09-04 19:32:00	450,50	455,50		e	-	2004-09-04 18:49:55	2004-09-04 19:10:15	4,73E-08	4,33E-08 0	1,6667E-08 8,3333E-04	5,67E-05
KLX04	2004-09-04 20:00:00	2004-09-04 22:34:00	455,50	460,50	7	•	-	2004-09-04 21:29:51	2004-09-04 21:32:23	4,25E-05	3,75E-05 0	1,6667E-08 8,3333E-04	1
KLX04	2004-09-04 23:06:00	2004-09-05 00:34:00	460,51	465,51		e	-	2004-09-04 23:52:15	2004-09-05 00:12:35	2,18E-08	1,00E-08 -1	1,6667E-08 8,3333E-04	2,62E-05
KLX04	2004-09-05 01:16:00	2004-09-05 02:44:00	465,52	470,52		m	-	2002-09-05 02:01:56	2004-09-05 02:22:16	1,33E-07	1,08E-07 0	1,6667E-08 8,3333E-04	1,60E-04
KLX04	2004-09-05 05:46:00	2004-09-05 06:52:00	470,52	475,52			-			•		1,6667E-08 8,3333E-04	1
KLX04	2004-09-05 07:27:00	2004-09-05 08:31:00	475,52	480,52			-			1		1,6667E-08 8,3333E-04	1
KLX04	2004-09-05 08:57:00	2004-09-05 10:00:00	480,52	485,52		~ ~	_	2004-09-05 09:33:24	2004-09-05 09:53:29	9,17E-07	8,50E-07 0	1,6667E-08 8,3333E-04	1,10E-03
4LX04	2004-09-05 10:34:00	2004-09-05 12:04:00	505,55	510,55			_ ,			' L.		1,666/E-08 8,3333E-04	' 00 L00
4LX04	2004-09-05 12:46:00	2004-09-05 13:58:00	510,56	515,56		~		2004-09-05 13:25:58	2004-09-05 13:46:04	Z, /4E-05	2,66E-05 0	1,666/E-08 8,3333E-04	3,29E-02
XLX04	2004-09-05 12 14:22:00	2004-09-05 15:33:00	515,56	520,56		~	_	2004-09-05 15:06:28	2004-09-05 15:26:39	7,83E-U/	6,83E-07 0	1,666/E-U8 8,3333E-U4	9,40E-04
XLX04	2004-09-05 16:01:00	2004-09-05 17:23:00	520,57	525,57		~	_	2004-09-05 16:51:30	2004-09-05 17:11:50	6,00E-06	5,55E-U6 U	1,666/E-08 8,3333E-04	1,20E-U3
XLX04	2004-09-05 18:19:00	2004-09-05 19:22:00	545,62	550,62 EEE 62				-	-	- 100 1		1,666/E-08 8,3333E-04	- 201 05
	2004-09-03 20.03.00	2004-03-03 21.40.00	550,02 555,63	500,02				2004-09-03 20:46:07	2004-09-03 ZI:00:ZI	2 17E_08	3,03E-U0 U	1,000/E-00 0,3333E-04	2,20E-03
KLX04	2004-09-06 00:46:00	2004-09-06 02:36:00	560.63	565.63				2004-09-06 01:33:54	2004-09-06 01:54:14	2, 1, E-00 1.23E-08	7.00E-09 -1	1,6667E-08 8.3333E-04	2,00E-03 1.48E-05
KO4	2004-09-06 06:09:00	2004-09-06 07:11:00	565,64	570,64				2004-09-06 06:44:23	2004-09-06 07:04:33	4.75E-06	4.62E-06 0	1.6667E-08 8.3333E-04	5.70E-03
<pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre>	2004-09-06 07:42:00	2004-09-06 08:46:00	570,64	575,64			-	2004-09-06 08:19:27	2004-09-06 08:39:42	1,57E-06	1,47E-06 0	1,6667E-08 8,3333E-04	1,88E-03
KLX04	2004-09-06 09:15:00	2004-09-06 10:19:00	575,65	580,65		E	-	2004-09-06 09:49:56	2004-09-06 10:07:05	6,48E-06	6,30E-06 0	1,6667E-08 8,3333E-04	6,61E-03
KLX04	2004-09-06 10:50:00	2004-09-06 12:10:00	580,65	585,65		, m	~	2004-09-06 11:28:56	2004-09-06 11:49:03	5,42E-06	5,13E-06 0	1,6667E-08 8,3333E-04	6,50E-03
KLX04	2004-09-06 13:11:00	2004-09-06 14:14:00	585,67	590,67				2004-09-06 13:47:12	2004-09-06 14:07:21	3,20E-06	2,72E-06 0	1,6667E-08 8,3333E-04	3,84E-03
XLX04	2004-09-06 14:45:00	2004-09-06 15:51:00	19,067	595,67		~	_	2004-09-06 15:19:57	2004-09-06 15:40:15	1,50E-07	1,1/E-0/ 0	1,666/E-08 8,3333E-04	1,80E-04
XLX04	2004-09-06 16:36:00	2004-09-06 18:14:00	500.60	600,69 605 60			_			- 101 105		1,000/E-08 8,3333E-04 1 6667F 00 0 2222F 04	
ALX04	2004-09-00 16:42:00	2004-09-00 20:11:00	60C 60	610,09				2004-09-00 19:29:12	2004-09-00 19:49:32	1,73E-U3		1,000/E-U8 8,3333E-U4 1 6667F 08 8,3333E-U4	2,U0E-U2 6 44F 02
XLX04	2004-09-06 20:00 2002	Z004-09-00 ZZ:11:00	610,009	610,09				2004-09-06 21:44:09	2004-09-06 22:04:09	0,3/E-00	2,05E-00 0	1,000/E-U0 0,3333E-U4	0,44E-U3
KLX04	2004-09-07 00:39:00	2004-09-07 02:03:00	615.70	620.70				2004-09-00 23:41:40	2004-09-07 01:41:38	2, 13E-00 1.50E-05	2,07 E-00 0 1.45E-05 0	1.6667E-08 8.3333E-04	2,30E-03 1.80E-02
<pre></pre>	2004-09-07 06:12:00	2004-09-07 07:18:00	620,71	625,71				2004-09-07 06:51:08	2004-09-07 07:11:16	8,73E-06	8,25E-06 0	1,6667E-08 8,3333E-04	1,05E-02
KLX04	2004-09-07 07:41:00	2004-09-07 08:49:00	625,71	630,71			-	2004-09-07 08:17:39	2004-09-07 08:37:46	3,04E-05	2,93E-05 0	1,6667E-08 8,3333E-04	3,65E-02
KLX04	2004-09-07 09:16:00	2004-09-07 10:14:00	630,72	635,72			-	•		•		1,6667E-08 8,3333E-04	1
<pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre> <pre></pre>	2004-09-07 10:44:00	2004-09-07 11:53:00	635,72	640,72			1	•		-	1	1,6667E-08 8,3333E-04	-
KLX04	2004-09-07 12:29:00	2004-09-07 13:28:00	640,73	645,73			-	•		-		1,6667E-08 8,3333E-04	
KLX04	2004-09-07 14:03:00	2004-09-07 15:10:00	645,73	650,73			-	2004-09-07 14:37:55	2004-09-07 14:58:07	6,67E-08	6,67E-08 0	1,6667E-08 8,3333E-04	8,00E-05

KLX04

						fo	hrmation_t			mean_flow_ f	low_rate_e value_t	ĸ	q_measl to	t_volume_
idcode	start_date	stop_date 5	secup ?	seclow	section_no	test_type yp	oe start_	flow_period	stop_flow_period	rate_qm r	id_qp pe_qp	q_measl	Ju vp	
KLX04	2004-09-07 15:37:00	2004-09-07 17:37:00	650,74	655,74		3 1		2004-09-07 16:45:26	2004-09-07 17:05:46	6,67E-09	5,00E-09 -1	1,6667E-08	8 8,3333E-04	8,00E-06
KLX04	2004-09-07 18:17:00	2004-09-07 20:10:00	655,75	660,75		3 1		2004-09-07 19:08:10	2004-09-07 19:28:30	5,00E-09	3,42E-09 -1	1,6667E-08	8 8,3333E-04	6,00E-06
KLX04	2004-09-07 22:36:00	2004-09-07 23:37:00	660,75	665,75		-		•	T	'		1,6667E-08	8 8,3333E-04	'
KLX04	2004-09-08 00:22:00	2004-09-08 01:45:00	665,76	670,76		3 1		2004-09-08 01:22:44	2004-09-08 01:23:04	1,72E-06	1,63E-06 0	1,6667E-08	8 8,3333E-04	3,40E-05
KLX04	2004-09-08 10:39:00	2004-09-08 12:33:00	670,76	675,76		3 1		2004-09-08 11:50:47	2004-09-08 12:11:07	2,52E-06	2,27E-06 0	1,6667E-08	8 8,3333E-04	3,02E-03
KLX04	2004-09-08 14:10:00	2004-09-08 15:44:00	675,77	680,77		4		2004-09-08 15:12:27	-	-	1-	1,6667E-08	8 8,3333E-04	'
KLX04	2004-09-08 16:18:00	2004-09-08 17:35:00	680,78	685,78		4 1		2004-09-08 17:02:52	-		-1-	1,6667E-08	8 8,3333E-04	'

a	155,1	255,3	355,4	455,5	555,6	655,7	755,8	856,0	115 01	135.25	155.3	175.3	195.32	215.34	235,35	255,38	275,38	295,4	315,41	335,44	355,44	375,47	395,47	415,49	435,51	455,5	475,52	495,52	515,55	535,58	555,62	575,64	595,65	615,69	635,71	655,73	675,76	695,79	815,98	836,02	00,008	0/0/00	020,11 046.46	910,10	930, IO	953,05	302 01	307.91	312,92	317,93	322,93	327,94 332,94
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fluid_te f mp_tew r	9.7	11,3	13,1	14,6	16,3	18,1	19,7	21,3	0,22	0,0	0,0	0 1 1	9.7	6.6	10,1	10,5	10,9	11,4	11,8	12,1	12,4	12,7	13,1	13,4	13,7	14,0	14,3	14,6	15,0	15,3	15,7	16,0	16,3	16,7	17,0	17,3	17,7	18,1	20,0	20,3	20,1	7 7 7 7 7 7	21 S	0, 1 v 0, 0	۲ ۲ ۲	2,22	111	11.3	11,5	11,6	11,7	11,8 11,8
inal_pres	1986	2967	3945	4926	5907	6884	7980	8842	10001	1402	1508	1703	1986	2184	2380	2576	2771	2969	3161	3356	3553	3748	3945	4141	4333	4545	4725	4932	5117	5336	5517	5709	5905	6102	6297	6503	6726	2007	- L	8415	- 20	9842	004z	9043	9449	9400	0868		3064	3113	3161	3210 3261
oress_at_flo_f v_end_pps	2181	2987	4146	5126	6106	7082	8104	9040	9019	1410	1798	1003	2188	2283	2582	2777	2976	3004	3362	3556	3750	3950	4188	4341	4532	4762	4922	5131	5317	5522	5721	5909	6104	6301	6499	6/12	6903	/182	' 007 0	8492		0700	20700	9240	9437	9603	3160	0	3285	3314	3363	3418 3477
initial_pre	1986	2966	3943	4926	5906	6881	7876	8840	1202	1402	1508	1703	1987	2182	2381	2576	2772	2968	3161	3356	3550	3748	3945	4141	4333	4536	4725	4929	5117	5320	5517	5708	5904	6101	6298	6497	6694	1969	8067	8293	1040	0040	2004	90.30	9231	9401	9068	3017	3065	3113	3161	3211 3261
final_hea i d_hf	13,51	13,64	13,61	13,97	14,35	14,40		14,81	10,02	13,07	13.35	13.41	13.22	13.28	13,53	13,50	13,63	13,70	13,57	13,46	13,46	13,60	13,60	13,67	13,46	13,19	13,42		13,47	'	13,81	13,96	14,20	14,37	14,28	13,84	13,03	'	'	'	- 00 4 4	14,34	14,70	15,03	10, 14	14,97	13 70 13 70		13,52	13,61	13,55	13,56 13,44
head_at_flow _end_hp																																																				
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dur_rec_p hase_tf	1800	600	1800	1200	1200	1500	5400	1800		1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	1200	2700	1200	'	1200	'	1800	600	600	1200	1200	1200	1200	1200	- 0000	3600	- 0001	10001	1200	0021		0071	1200	-	1200	600	1200	300 1200
dur_flow_ phase_tp	1800	1800	1800	1800	1800	1800	' 0010	2/00	1200	1200	1200	1200	1200	1200	1200	1200	1200	1560	1200	1200	1200	1200	1200	1200	1200	1200	1200	'	1200	'	1200	1200	1200	1200	1200	1200	1200	1200	' 0	60	' 000 F	1000		1200	0021	0021	1200		1200	1200	1200	1200 1200

<u>م</u>	337,94	342,94	347,94	352,95	357,97	362,97	372.97	377.97	382,97	387,97	392,98	397,98	402,98	407,99	413	418,01	423,01	428,01	433,01	438	443	448	453	458	463,01	468,02	473,02	478,02	483,02	508,05	513,06	518,06	523,07	548,12	553,12	558,13	563,13	568,14	573,14	578,15	583,15	588,17	593,17	598,19	603,19	608,19	613,20	618,20	623,21	628,21	633,22	638,22	043,23 648,23
comment s																																																					
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fluid_salini ty_tdswm																																																					
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fluid_te mp_tew	11,9	12,0	12,1	12,2	12,4	12,4	12.6	12.7	12,8	12,9	12,9	13,0	13,1	13,2	13,3	13,3	13,4	13,5	13,5	13,6	13,7	13,8	13,9	13,9	14,0	14,1	14,2	14,2	14,3	14,7	14,8	14,9	15,0	15,4	15,5	15,6	15,7	15,7	15,8	15,9	16,0	16,1	16,1	16,2	16,3	16,4	16,5	16,6	16,7	16,8	16,8	10,9	17,1
final_pres s_pf	3309	3359	3408	3458	3506	3553	3647	3694	3649	3918	3892	4091	3943	3991	4040	4088	4158	4196	4242	'	4336	4504	4454	4582	4533	4589			4727		5026	5077	5124		5418	5468	5514	5560	5609	5660	5712	5763	5814		5908	5956	6003	6051	6098	6148	'		- 6352
oress_at_flo v_end_pp	3512	3557	3607	3658	3707	3/49	3830	3884	3947	4009	4061	4138	4156	4207	4257	4288	4343	4398	4450	'	4548	4607	4653	4699	4751	4799	T	-	4943		5226	5301	5325		5641	5689	5736	5772	5823	5857	5911	5979	6027	1	6107	6186	6203	1629	6298	6347		1	- 6566
initial_pre ss_pi	3310	3359	3408	3457	3507	3555	3647	3694	3744	3807	3859	3930	3944	3992	4040	4088	4143	4192	4238	4289	4337	4404	4445	4497	4531	4580	4634	4683	4726	4977	5025	5077	5124	5372	5417	5464	5515	5559	5607	5659	5710	5762	5814	5862	5908	5956	6004	6052	6097	6147	6199	624Q	0299 6354
final_hea i d_hf	13,75	13,92	13,80	13,81	13,84	13,64	13.25	12.98	13,25		1	1	13,58	13,48	13,13	13,30	1	-	13,87	'	13,45	1	11,40	'	13,53	12,68	I		13,71	'	14,38	14,55	14,46		13,51	12,57	13,50	13,75	14,00	13,98	14,46	14,60	14,68	1	14,47	14,43	14,24	14,07	13,79	13,81	1	•	- 14,08
head_at_flow _end_hp																																																					
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dur_rec_p hase_tf	300	300	1200	1200	600	600	000	660	1200	3600	2400	1800	1200	1200	1200	1200	2100	1800	3600	'	300	2400	1200	3600	1200	1200	1		300	'	600	300	600	-	1200	1200	2400	300	300	600	1200	300	600		1200	300	300	1200	300	600			600
dur_flow_ phase_tp	1200	1200	1200	1200	1200	1200	1200	1020	1200	155	57	27	1200	1200	1200	1200	46	33	1200		1200	38	1200	152	1200	1200	T	1	1200	1	1200	1200	1200		1200	1200	1200	1200	1200	1020	1200	1200	1200	1	1200	1200	1200	1200	1200	1200	'	1	1200

		24	25	25	26	26	27	28
	d	653,2	658,2	663,2	668,2	673,2	678,2	683,2
comment	S							
	reference							
fluid_salini	ty_tdswm							
fluid_salin	ity_tdsw							
fluid_elco	nd_ecw							
fluid_te	mp_tew	17,1	17,2	17,3	17,4	17,5	17,6	17,7
final_pres	s_pf	6408	6455		6541	6601	6651	6703
press_at_flo	w_end_pp	6614	6662	1	6742	6798	6861	6915
initial_pre	ss_pi	6410	6458	6498	6540	6629	6648	6703
final_hea	d_hf	13,55	14,10	'	14,05	14,42	-	-
head_at_flow	_end_hp							
initial_head	-hi							
dur_rec_p	hase_tf	1800	2400	'	1200	1200	1800	1800
dur_flow_	phase_tp	1200	1200	'	20	1200	-	•

Table		plu_s_hole_	_test_ed1
	PLU S	Single hole tests, pumpinç	g/injection. Basic evaluation
column	Datatvpe	Unit	Column Description
ite	CHAR		Investigation site name
ictivity_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
dcode	CHAR		Object or borehole identification code
ecup	FLOAT	E	Upper section limit (m)
sectow	FLOAT	E	Lower section limit (m)
section_no	INTEGER	number	Section number
est_type	CHAR		Test type code (1-7), see table description!
ormation_type	CHAR		Formation type code. 1: Rock, 2: Soil (superficial deposits)
۵	FLOAT	E	Hydraulic point of application
seclen_class	FLOAT	E	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.
ʻalue_type_q_s	CHAR		0:true value,-1:Q/s <lower meas.limit,1:q="" s="">upper meas.limit</lower>
ransmissivity_tq	FLOAT	m**2/s	Tranmissivity based on Q/s, see table description
/alue_type_tq	CHAR		0:true value,-1:TQ <lower meas.limit,1:tq="">upper meas.limit.</lower>
oc_tq	CHAR		Best choice code. 1 means TQ is best choice of T, else 0
ransmissivity_moye	FLOAT	m**2/s	Transmissivity,TM, based on Moye (1967)
oc_tm	CHAR		Best choice code. 1 means Tmoye is best choice of T, else 0
/alue_type_tm	CHAR		0:true value,-1:TM <lower meas.limit,1:tm="">upper meas.limit.</lower>
iydr_cond_moye	FLOAT	m**2/s	K_M: Hydraulic conductivity based on Moye (1967)
ormation_width_b	FLOAT	E	b:Interpreted formation thickness repr. for evaluated T/TB
vidth_of_channel_b	FLOAT	E	B:Interpreted width of formation with evaluated TB
a	FLOAT	m**3/s	TB:T=transmissivity,B=width of formation,see description
_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	E	SB:S=storativity,B=width of formation,1Dmodel,see descript.
assumed_sb	FLOAT	E	SB* : Assumed SB, S=storativity, B=width of formation, see
eakage_factor_lf	FLOAT	E	Lf:1D model for evaluation of Leakage factor
ransmissivity_tt	FLOAT	m**2/s	T=transmissivity, 2D model, see table description
/alue_type_tt	CHAR		0:true value,-1:TT <lower meas.limit,1:tt="">upper meas.limit,</lower>
oc_tt	CHAR		Best choice code. 1 means TT is best choice of T, else 0
_measl_q_s	FLOAT	m**2/s	Estimated lower meas. limit for evaluated T,see table descr.
u_measl_q_s	FLOAT	m**2/s	Estimated upper meas. limit for evaluated T,see description
storativity s	FI OAT		2D model for evaluation of S=storativity see table descript

assumeu_s leakane kneff	FLOAT	1/s	K'/h'·2Dmodel eva	liy,∠∪ model evalu luation of leakage	ialiori,see lable des coefficient see des					
hydr cond ks	FLOAT	m**2/s	Ks:3D model evalu	lation of hydraulic	conductivity, see de	esc.				
value type ks	CHAR		0:true value,-1:Ks•	<lower meas.limit,<="" td=""><td>1:Ks>upper meas.li</td><td>imit,</td><td></td><td></td><td></td><td></td></lower>	1:Ks>upper meas.li	imit,				
l_meas_limit_ks	FLOAT	m**2/s	Estimated lower m	leas.limit for evalu	ated Ks, see table	desc.				
u_meas_limit_ks	FLOAT	m**2/s	Estimated upper n	heas.limit for evalu	iated Ks,see table (descr.				
spec_storage_ss	FLOAT	1/m	Ss:Specific storag	e,3Dmodel evalua	tion,see table desc	'n.				
assumed_ss	FLOAT	1/m	Assumed Spec.stc	srage,3D model ev	/aluation,see table	des.				
C	FLOAT	m**3/pa	C: Wellbore storag	te coefficient						
cd	FLOAT		CD: Dimensionles:	s wellbore storage	constant					
skin	FLOAT		Skin factor							
stor_ratio	FLOAT		Storativity ratio							
interflow_coeff	FLOAT		Interporosity flow (coefficient						
dt1	FLOAT	S	Estimated start tin	ie of evaluation, s	se table description					
dt2	FLOAT	S	Estimated stop tim	te of evaluation. se	se table description	-				
transmissivity_t_ilr	FLOAT	m**2/s	T_ILR Transmissiv	/ity based on Non	e Linear Regressio	n				
storativity_s_ilr	FLOAT		S_ILR=storativity t	based on None Lir	rear Regression, se	ë.				
value_type_t_ilr	CHAR		0:true value,-1:T_I	LR <lower lii<="" meas="" td=""><td>mit,1:>upper meas.</td><td>limit</td><td></td><td></td><td></td><td></td></lower>	mit,1:>upper meas.	limit				
bc_t_ilr	CHAR		Best choice code.	1 means T_ILR is	best choice of T, e	ise 0				
c_ilr	FLOAT	m**3/pa	Wellbore storage (coefficient, based	on ILR, see descr.					
cd_ilr	FLOAT		Dimensionless we	Ilbore storage con	stant, see table de	scrip.				
skin_ilr	FLOAT		Skin factor based	on Non Linear Re	gression, see desc.					
stor_ratio_ilr	FLOAT		Storativity ratio ba	sed on Non Linea	r Regression, see c	lescr.				
interflow_coeff_ilr	FLOAT		Interporosity flow (coefficient based c	yn Non Linear Regr					
transmissivity_t_grf	FLOAT	m**2/s	T_GRF:Transmiss	ivity based on Ge	n.Rad. Flow,see					
value_type_t_grf	CHAR		0:true value,-1:T_(3RF<lower b="" meas.<=""></lower>	limit,1:>upper mea	s.limit				
bc_t_grf	CHAR		Best choice code.	1 means T_GRF	is best choice of T,	else 0				
storativity_s_grf	FLOAT		S_GRF:Storativity	basd on Gen. Rau	d.Flow, see table d	escri.				
flow_dim_grf	FLOAT		Flow dimesion bas	sed on Gen. Rad.F	⁻ low. interpretation	model				
comment	VARCHAR	no_unit	Short comment to	the evaluated par-	ameters					
error_flag	CHAR		If error_flag = "*" ti	hen an error occur	ed and an error.					
in_use	CHAR		If in_use = "*" then	the activity has b	een selected as					
sign	CHAR		Signature for QA c	tata accknowledg	∋ (QA - OK)					
						fo	rmation_t		seclen cl	spec_cap_value_ty
idcode	start_date	stop_date	secup	seclow	section_no	test_type yp	De _	lp	ass	acity_q_s pe_q_s
KLX04	2004-08-20 10:27	2004-08-20 12:44	105,11	205,11		3 1		155,11	100	8,45E-06 0
KLX04	2004-08-20 16:11	2004-08-20 17:40	205,34	305,34		3		255,34	100	2,15E-04 0
KLX04	2004-08-21 08:14	2004-08-21 10:33	305,41	405,41		3		355,41	100	7,93E-06 0
KLX04	2004-08-21 11:48	2004-08-21 13:37	405,49	505,49		3		455,49	100	4,12E-07 0

1 2004-09-23 173-51 776-51 </th <th>24</th> <th>2004-08-21 14:57 2004-08-22 08-12</th> <th>2004-08-21 16:40 2004-08-22 10:00</th> <th>505,55 605,69</th> <th>605,55 705 60</th> <th><u>ო</u> ო</th> <th>1 555,5 1 655,6</th> <th>55 100 39 100</th> <th>2,83E-06 0 2 24E-06 0</th> <th></th>	24	2004-08-21 14:57 2004-08-22 08-12	2004-08-21 16:40 2004-08-22 10:00	505,55 605,69	605,55 705 60	<u>ო</u> ო	1 555,5 1 655,6	55 100 39 100	2,83E-06 0 2 24E-06 0	
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2004-08-24 (05:10) 105.21 105.21 105.24		2004-08-23 08:00	2004-08-23 09:51	886,11	986,11	3	1 936,1	11 100	7,36E-07 0	
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2004-06-26 20 105.30 155.30 1 175.30 20 478E-00 2004-06-26 0575 2004-06-26 155.31 205.32 205.32 20 478E-00 2004-06-26 0575 2004-06-26 155.35 205.41 30 1 255.38 20 478E-00 2004-06-30 0755 2004-06-30 155 2004-06-30 155 2004-06-30 155 20 478E-00 2004-06-30 555 2004-06-30 155 206.41 305.41 306.41 215.53 20 478E-00 2004-06-30 105 2004-06-30 157 2004-06-30 176 216.41 20 478E-00 20 478E-00 20 478E-00 20 478E-00 20 478E-00 20 478E-00 20 478E-00 20 478E-00 20 478E-00 20 478E-00 20 478E-00 20 478E-00 20 478E-00 20 478E-00 20 478E-00		2004-08-24 21:02	2004-08-24 22:45	145,30	165,30	e	1 155,3	30 20	3,53E-08 0	
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963.05	983,05	305,41	310,41	315,42	320,43	325,43	330,44	335,44	340,44	345,44	350,44	355,45	360,47	365,47	370,47	375,47	380,47	385,47	390,47	395,48	400,48	405,48	410,49	415,50	420,51	425,51	430,51	435,51	440,50	445,50	450,50	455,50	460,50	465,51	470,52	475,52	480,52	485,52	510,55	515,56	520,56
943.05	963,05	300,41	305,41	310,42	315,43	320,43	325,44	330,44	335,44	340,44	345,44	350,45	355,47	360,47	365,47	370,47	375,47	380,47	385,47	390,48	395,48	400,48	405,49	410,50	415,51	420,51	425,51	430,51	435,50	440,50	445,50	450,50	455,50	460,51	465,52	470,52	475,52	480,52	505,55	510,56	515,56
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520,57	545,62	550,62	555,63	560,63	565,64	570,64	575,65	580,65	585,67	590,67	595,69	600,69	605,69	610,70	615,70	620,71	625,71	630,72	635,72	640,73	645,73	650,74	655,75	660,75	665,76	670,76	675,77	680,78
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)E-09 1,40E-01 9,00E-01)E-10 3,20E-02 2,60E+00	DE-10 1,50E-02 2,70E+00)E-10 3,30E-02 0,00E+00)E-09 2,30E-01 -1,40E+00	JE-09 2,00E-03 2,30E+00)E-11 9,30E-05 1,73E+01)E-11 7,10E-05 6,80E+00)E-10 1,40E-04 2,60E+00	JE-09 1,40E-03 1,90E+00	JE-08 2,70E+00 1,80E+00)E-11 7,20E-03 -1,80E+00	JE-09 4,20E-01 1,60E+00)E-10 1,20E-02 1,49E+01	JE-08 4,40E+00 -5,90E+00)E-10 2,00E-02 4,60E+00)E-11 8,00E-03 -2,50E+00	JE-09 5,50E-01 3,02E+01)E-10 1,60E-02 4,60E+00)E-11 6,00E-03 1,70E+00	IE-10 7,54E-02 3,01E+01)E-11 6,60E-03 9,00E-01	re-10 1,73E-02 -1,60E+00	5E-11 1,60E-03 -1,16E+00)E-11 3,30E-03 1,60E+00)E-10 4,80E-02 1,50E+00)E-11 3,70E-03 3,30E+00	FE-11 8,20E-03 -9,00E-01	JE-09 1,20E-01 0,00E+00	JE-10 1,00E-01 -5,00E-01	0E-10 6,80E-02 3,80E+00	JE-10 2,90E-02 1,90E+00	JE-11 5,20E-03 -3,00E-01	JE-11 5,50E-03 -9,00E-01)E-11 3,80E-03 5,90E+00	######SAKNASi #SAKNASi	iSVNAS# iSANAAS# #####	#### #SAKNAS! #SAKNAS!)E-11 5,90E-03 0,00E+00)E-11 9,60E-03 4,80E+00)E-10 1,30E-02 -1,10E+00)E-11 1,10E-02 -2,30E+00
1,30	2,90	1,40	3,00	2,1(1,8(8,4(6,40	1,3(1,3(2,4(6,50	3,8(1,10	4,00	1,8(7,30	5,00	1,50	5,50	6,87	6,00	1,57	1,45	3,00	4,30	3,4(7,44	1,10	9,3(6,20	2,60	4,8(5,00	3,4(#####		#####	5,3(8,7(1,20	9,7(
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1,00E-06 5,00E-06 1,00E-(2,00E-06 5,00E-06 1,00E-0	8,00E-11 7,00E-10 1,00E-0	2,00E-08 8,00E-08 1,00E-0	6,00E-07 1,00E-06 1,00E-0	9,00E-07 5,00E-06 1,00E-0	1,00E-07 7,00E-07 1,00E-0	2,00E-08 7,00E-08 1,00E-0	3,00E-07 7,00E-07 1,00E-0	4,00E-06 2,00E-05 1,00E-0	4,00E-05 9,00E-05 1,00E-0	3,00E-07 8,00E-07 1,00E-0	9,00E-06 4,00E-05 1,00E-0	4,00E-07 2,00E-06 1,00E-0	4,00E-05 2,00E-04 1,00E-0	2,00E-07 7,00E-07 1,00E-0	7,00E-08 2,00E-07 1,00E-0	8,00E-06 6,00E-05 1,00E-0	2,00E-07 8,00E-07 1,00E-0	2,00E-09 6,00E-09 1,00E-0	3,00E-07 4,00E-06 1,00E-0	3,00E-08 8,00E-08 1,00E-0	7,00E-10 4,00E-09 1,00E-0	8,00E-09 4,00E-08 1,00E-0	1,00E-10 1,00E-09 1,00E-0	9,00E-07 3,00E-06 1,00E-0	7,00E-11 7,00E-10 1,00E-0	9,00E-10 3,00E-09 1,00E-0	3,00E-07 1,00E-06 1,00E-0	8,00E-07 4,00E-06 1,00E-0	1,00E-06 6,00E-06 1,00E-0	1,00E-06 4,00E-06 1,00E-0	9,00E-10 4,00E-09 1,00E-0	7,00E-08 5,00E-07 1,00E-0	9,00E-11 6,00E-10 1,00E-0	************************	*######################################	************************	8,00E-09 6,00E-08 1,00E-0	7,00E-09 4,00E-08 1,00E-0	5,00E-08 4,00E-07 1,00E-0	5,00E-08 4,00E-07 1,00E-0

9,00E-08 4,00E-07 1,00E-06 1,00E-06	9,00E-11 9,90E-03 5,20E+00
5,00E-08 2,00E-07 1,00E-06 1,00E-06	6,10E-10 6,70E-02 5,00E-01
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1,00E-07 8,00E-07 1,00E-06 1,00E-06	4,82E-11 5,31E-03 5,50E+00
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6,00E-09 4,00E-08 1,00E-06 1,00E-06	1,51E-11 1,66E-03 0,00E+00
8,00E-08 5,00E-07 1,00E-06 1,00E-06	1,46E-11 1,61E-03 2,16E+01
3,00E-09 4,00E-08 1,00E-06 1,00E-06	2,04E-11 2,25E-03 3,30E+01
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1,00E-08 6,00E-08 1,00E-06 1,00E-06	1,49E-11 1,64E-03 1,30E+00
7,00E-08 4,00E-07 1,00E-06 1,00E-06	######################################
6,00E-06 4,00E-05 1,00E-06 1,00E-06	1,88E-09 2,07E-01 5,90E+00
1,00E-06 9,00E-06 1,00E-06 1,00E-06	2,88E-10 3,17E-02 3,17E+01
5,00E-07 2,00E-07 1,00E-06 1,00E-06	6,92E-11 7,63E-03 8,60E+00
2,00E-09 4,00E-08 1,00E-06 1,00E-06	1,51E-11 1,66E-03 0,00E+00
3,00E-08 9,00E-08 1,00E-06 1,00E-06	1,19E-11 1,31E-03 4,00E-01
9,00E-08 4,00E-07 1,00E-06 1,00E-06	7,13E-11 7,86E-03 -1,30E+00
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7,00E-12 5,00E-11 1,00E-06 1,00E-06	8,50E-12 9,37E-04 2,30E+00
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2,00E-09 8,00E-09 1,00E-06 1,00E-06	1,41E-11 1,55E-03 0,00E+00
8,00E-09 3,00E-09 1,00E-06 1,00E-06	1,46E-11 1,61E-03 0,00E+00
7,00E-07 5,00E-06 1,00E-06 1,00E-06	6,07E-10 6,69E-02 3,13E+01
5,00E-11 3,00E-10 1,00E-06 1,00E-06	6,27E-12 6,91E-04 3,60E+00
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1,00E-08 8,00E-08 1,00E-06 1,00E-06	1,85E-11 2,04E-03 0,00E+00
1,00E-12 1,00E-11 ######## 1,00E-06	8,93E-12 9,84E-04 1,00E+00
8,00E-10 4,00E-09 1,00E-06 1,00E-06	6,26E-11 6,90E-03 1,40E+00
3,00E-11 3,00E-10 ######## 1,00E-06	4,92E-11 5,42E-03 1,10E+00
6,00E-10 4,00E-09 1,00E-06 1,00E-06	1,35E-11 1,49E-03 1,59E+01
7,00E-10 7,00E-09 1,00E-06 1,00E-06	1,55E-10 1,71E-02 2,10E+00
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7,00E-08 4,00E-07 1,00E-06 1,00E-06	1,30E-11 1,43E-03 1,06E+01
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9,00E-07 5,00E-06 1,00E-06 1,00E-06	1,59E-10 1,75E-02 4,30E+00
9,00E-09 5,00E-08 1,00E-06 1,00E-06	1,75E-11 1,93E-03 2,60E+00

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0,00E+0	#SAKNAS	5,41E+0	5,46E+0	1,03E+0	1,05E+0	8,60E+0	1,09E+0	1,60E+0	3,00E+0	0+00E+0	#SAKNAS	0+00E+0	1,80E+0	9,50E+0	7,70E+0	1,50E+0	5,90E+0	#SAKNAS	#SAKNAS	#SAKNAS	1,90E+0	2,40E+0	4,20E+0	#SAKNAS	8,00E+0	9,00E-0	3,80E+0	6,10E+0
3,65E-03	#SAKNAS!	2,01E-03	1,84E-03	1,22E-03	1,58E-02	2,17E-03	7,01E-02	7,25E-02	1,87E-03	1,91E-03	#SAKNAS!	9,21E-02	2,92E-03	6,56E-03	1,60E-02	4,94E-03	2,18E-02	#SAKNAS!	#SAKNAS!	#SAKNAS!	1,59E-03	7,67E-04	5,15E-04	#SAKNAS!	2,28E-03	1,58E-03	9,30E-04	2,57E-03
3,31E-11	#########	1,82E-11	1,67E-11	1,11E-11	1,43E-10	1,97E-11	6,36E-10	6,58E-10	1,70E-11	1,73E-11	#########	8,36E-10	2,65E-11	5,95E-11	1,45E-10	4,48E-11	1,98E-10	######################################	######################################	######################################	1,44E-11	6,23E-12	4,67E-12	#######################################	2,07E-11	1,43E-11	8,44E-12	2,33E-11
1,00E-06	1,00E-06	1,00E-06	1,00E-06	1,00E-06	1,00E-06	1,00E-06	1,00E-06	1,00E-06	1,00E-06	1,00E-06	1,00E-06	1,00E-06	1,00E-06	1,00E-06	1,00E-06	1,00E-06	1,00E-06	1,00E-06	1,00E-06	1,00E-06	1,00E-06	1,00E-06	1,00E-06	1,00E-06	1,00E-06	1,00E-06	1,00E-06	1,00E-06
1,00E-06	##########	1,00E-06	1,00E-06	1,00E-06	1,00E-06	1,00E-06	1,00E-06	1,00E-06	1,00E-06	1,00E-06	#########	1,00E-06	1,00E-06	1,00E-06	1,00E-06	1,00E-06	1,00E-06	##########	#########	#########	1,00E-06	1,00E-06	1,00E-06	#########	1,00E-06	1,00E-06	##########	############
5,00E-07	#######################################	4,00E-09	3,00E-09	2,00E-09	6,00E-07	4,00E-07	2,00E-06	6,00E-07	5,00E-07	9,00E-09	#######################################	3,00E-06	7,00E-07	6,00E-07	4,00E-06	9,00E-07	6,00E-06	#######################################	#######################################	#######################################	5,00E-09	6,00E-10	6,00E-10	#######################################	5,00E-07	4,00E-08	6,00E-10	5,00E-09
9,00E-08	##########	7,00E-10	5,00E-10	1,00E-10	3,00E-07	7,00E-08	6,00E-07	8,00E-08	8,00E-08	1,00E-09	##########	7,00E-07	1,00E-07	9,00E-08	6,00E-07	2,00E-07	9,00E-07	##########	#########	#########	7,00E-10	8,00E-11	7,00E-11	#########	8,00E-08	8,00E-08	8,00E-11	5,00E-10

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130	1397					
16	151					
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241	1496					
111	211					
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67	650					
47	854					
497	749					
83	670					
34	128					
26	246					
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95	893					
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