



WELL NAME 34/10-3 AREA NORTH SEA
OPERATOR STATOIL RIG NORSKALD
ENGINEERS ASBJØRNSEN, LARSEN, HELLSTRAND, ÅRSETH

Drilling Mud Properties Record

MUD SYSTEM LIGNOSULFONATE/BENTONITE

Day No.	DATE	DEPTH FEET METERS	MUD PROPERTIES																			OPERATION REMARKS	
			DENSITY PPG □ SG □	VISCOSITY				GELS 0	FLUID LOSS 30 Min cc's	CAKE 32 hrs	H.T.H.P. cc's	PH	Filtrate Analysis			RETORT		BENTONITE #/BBL	POTASH #/BBL	POLYMER #/BBL	"N"		"K"
				sec/qt	A.V. cps	P.V. cps	Y.P. #/100 sq.ft.						Ca. ++ ppm	PI	% OIL	% SOLIDS	% SAND						
2	15.3		1.02	86																		Drl. 36" hole.	
3	16.	257	1.02	38	15	5	20	10/12	N/C													Drl. cmt. 26" bit. Made riser connect	
4	17.	257	1.02	37	14	5	18	9/12	N/C													RIH w/17 1/2" bit. Slip joint leak	
5	18.	381	1.08	44	23	6	34	18/26	N/C													Drl. 17 1/2" pilot hole.	
6	19.	586	1.09	42	19	6	26	17/25	N/C													Drl 17 1/2". Logging.	
7	20.	586	1.09	38	19	6	23	16/25	N/C				.05									Underreaming 26". Balljoint leaking.	
8	21.	586	1.05	100	28	6	46		N/C			4	120	0.1								u/ream 26". Displ.hole to high v.mud.Wi.trip	
9	22.	571		40	15	8	14	8/14	N/C													Run + cement 20" casing.	
10	23.	571	1.06	40	15	8	14	8/14	N/C													Mix. mud running BOP.	
11	24.		1.06	40	15	8	14	8/14	N/C			11.0										RIH 17 1/2" drl., cmt. with seawater.	
12	25.	962	1.14	41	19	13	12	6/18	20	4		10.5	14	160	0.2	10	TR	15			0.60	Drl.shoe.L/off=13x4 lb/gal. Drlg.	
13	26.	1170	1.14	42	20	13	14	10/26	15	2		10.7	13	160	0.2	10	TR	15			0.57	Drl. trip.WOW.RIH. Drl.	
14	27.	1435	1.14	42	21	12	18	8/24	12	2		9.5	9	200	0.2	10	0.5	17.5			0.49	1.46	Drl. lost mud to sandstone. POOH.
15	28.	1488	1.14	48	25	15	20	16/45	13	2		9.5	8	220	0.1	10	0.3	17.5			0.51	1.45	RIH drlg. to 1488. wi.trip. POOH logging
REMARKS																							

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 MUD SYSTEM GEL/LIGNO

 WELL NAME 34/10-3 AREA NORTH SEA
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Day No.	DATE	DEPTH FEET □ METERS □	MUD PROPERTIES																		OPERATION REMARKS		
			DENSITY PPG □ SG □	VISCOSITY				GELS 0 10	FLUID LOSS 30 Min cc's	CAKE 32 nds	H.T.H.P. cc's	pH	Filtrate Analysis			RETORT		BENTONITE #/BBL	POTASH #/BBL	POLYMER #/BBL		"N"	"K"
				sec/qt	A.V. cps	P.V. cps	Y.P. #/100 sq.ft.						Cl ⁻ ppm	Ca. ++ ppm	Pf /Mf	% OIL	% SOLIDS						
1979																							
16	29.	1488	1.16	47	30	20	20	10/30	15	2	9.8	10	280	0.15		10	TR	17.5			0.58	1.04	Check trip. Running casing.
17	30.	1488	1.16	42	20	13	14	6/20	12	2	9.6	9	220	0.10			TR	17.5					Run 13-3/8" csg. Loosing mud through slip joint. Work on slip joint. Build.
18	31.	1488	1.16	40	19	14	10	2/5	10	1	10.3	9	180	0.15			TR	15					new mud. Drl. cmt. & new formation.
19	1.4	1530	1.50	50	34	23	22	22/56	12	2	10.6	9	160	.25		14	3/4	17.5					
20	2.	1810	1.50	43	19	15	8	1/6	6.0	1	1.0	14	120	1.2		15	1/4	22.0			.72	.25	Drl. ahead.
21	3.	1820	1.55	44	16.5	12	9	1/9	5.5		1.0	14	120	1.2		18	TR	22.5			.65		Circ. weight up to 13.0.
22	4.	1820	1.60	46	26	20	12	8/25	5.5	1	1.0	12	120	1.2		24	TR	22.5					Circ. logg. Circ. out 1350 units gas, weight up to 1.60. Run, cmt. 9-5/8" csg.
23	5.	1820	1.60	47	27	21	12	8/30	5.5	1	1.0	12	120	1.2		23	TR	22.5					
24	6.	1820	1.60	47	22	17	10	8/35	5.5	1	1.0	12	160	1.2		23	TR	22.5					Drl. csg. shoe.
25	7.	1865	1.78	50	25	18	14	4/38	6.0	2	10.0	12	120	.23/4		25	1/2	20					Incr. mud weight 1.60 > 1.78 SG.
26	8.	1919	1.78	47	25	20	11	5/42	4.9	1	1.2	11.5	80	2.6/4.6		24	.3	20					Cut core no. 1.
27	9.	1936	1.78	50	25	16	11	3/20	4.2	1	14.2	11.0	12	140	1.9/3.7		26	.5	20				Cut core no. 2+3.
28	10.	1953	1.78	48	24	18	11	3/17	4.8	1	15.2	11.0	12	100	1.6/2.7		25	.3	21				Cut core no. 4.
29	11.	1972	1.78	53	26.5	18	9	3/27	4.4	1	15	10.5	11.5	160	1.7/3.3		25	.3	22				Cut core no. 5.
REMARKS																							

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Day No.	DATE	DEPTH FEET <input type="checkbox"/> METERS <input checked="" type="checkbox"/>	MUD PROPERTIES																			OPERATION REMARKS				
			DENSITY PPG <input type="checkbox"/> SG <input checked="" type="checkbox"/>	VISCOSITY				GELS 0	FLUID LOSS 30 Min cc's	CAKE 32 rds	H.T.H.P. cc's	pH	Filtrate Analysis			RETORT		BENTONITE #/BBL	POTASH #/BBL	POLYMER #/BBL	"N"		"K"			
				sec/qt	A.V. cps	P.V. cps	Y.P. #/100 sq.ft.						Ca. ++ ppm	PI/MF	% OIL	% SOLIDS	% SAND									
30	12.	1992	1.78	51	25.5	18	12	4	30	4	1	11	11.0	11	160	1.7	3.2	26	.3	22						Cut core no. 6.
31	13.	2013	1.78	52	26	20	10	3	18	4	1		10.5	11	200	1.3	2.6	25	.4	22.5						Cut core no. 7.
32	14.	2117	1.78	51	24	19	10	3	21	3.6	1	15.2	11.0	11.5	100	1.5	2.8	26	1/4	22.0						Cut core no. 8, drl. 8 1/2" hole.
33	15.	2200	1.78	52	23.5	19	9	3	26	3.4	2	15.8	11.0	11	120	1.5	2.7	25	TR	22.0						Drl. 8 1/2" hole, trip for new bit.
34	16.	2340	1.75	49	25.5	21	9	3	22	3.8	2	15.0	11.0	10.5	160	1.0	2.3	26	TR	22.5						Drl. 8 1/2" hole, cut mudwt. to 1.75.
35	17.	2347	1.75	52	26.5	22	9	2	16	3.8	1	15.0	10.5	10.5	140	0.9	2.2	25	TR	22.5						Ready for logging.
36	18.	2347	1.75	50	25.5	21	9	2	14	4.0	1	15.4	10.5	10.5	140	1.0	1.9	24	TR	22.0						Logging.
37	19.	2347	1.75	53	25.0	20	10	3	23	3.7	1	15.2	11.0	11	80	1.5	2.8	24	TR	22.5						Logging.
38	20.	2347	1.75	50	25	20	10	4	38	3.8	1	15.0	10.8	11	80	1.3	2.5	24	TR	20						Run 7" liner.
39	21.	2347	1.75	49	23	18	10	3	27	4	1	15.2	10.8	10.5	100	1.4	2.6	24	TR	20						Break down DP.
40	22.	2347	1.74	46	20	16	8	2	23	5.6	2	17.5	11.0	11	130	1.5	3.2	23	TR	15						Pulling BOP.
41	23.	2347	1.74	46	20	16	8	2	23	5.6	2	17.5	11.0	11	130	1.5	3.2	23	TR	15						Testing BOP.
42	24.	2347	1.74	46	20	16	8	2	23	5.6	2	17.5	11.0	11	130	1.5	3.2	23	TR	15						Pulling BOP (leak).
43	25.	2347	1.74	46	20	16	8	2	23	5.6	2	17.5	11.0	11	130	1.5	3.2	23	TR	15						Landing and testing BOP.

REMARKS

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			DENSITY PPG <input type="checkbox"/> SG <input checked="" type="checkbox"/>		VISCOSITY				GELS	FLUID LOSS 30 Min cc's	CAKE 32 nds	H.T.H.P. cc's	PH	Filtrate Analysis			RETORT		BENTONITE #/BBL	POTASH #/BBL	POLYMER #/BBL	"N"		"K"			
			sec/qt	A.V. cps	P.V. cps	Y.P. #/100 sq. ft.	0	10	Ca. ++ ppm					PI /MF	% OIL	% SOLIDS	% SAND										
44	26.	2347	1.72	50	27	20	14	4	5.4	2	21.0	11.5	12	250	2.7		22	TR	16.2							Logging.	
45	27.	2347	1.72	50	27	20	14	4	5.4	2	21.0	11.5	12	250	2.7		22	TR	16.2							Work on draw block.	
46	28.	2362	1.60	53	30	23	14	6	5.4	2	17.0	11.0	12	240	3.5		20	TR	22.5							Mud wt. cut to 1.60.	
47	29.	2397	1.60	50	24.5	16	17	3	5.4	2	18.2	11.5	11	150	3.5		20	TR	20.0							RIH with 6" bit.	
48	30.	2453	1.60	51	22	17	10	3	4.8	2	15.4	11.4	10	80	3.2		20	TR	20.0							Tripping in order to	
49	1.5.	2468	1.60	50	17	20	15	4	5.0	2	16.0	11.3	10	90	4.4		20	TR	20.0							core. No activity due	
50	2.		1.60	50	22.5	17	11	2	5.0	2	15.1	11.3	10.5	80	4.5		20	TR	20.0							to bad weather.	
51	3.	2512	1.60	49	19.5	16	7	2	5.0	2	15.1	11.3	10.5	80	2.7		20	TR	17.5							Coring.	
52	4.	2512	1.60	50	18	15	6	2	5.2	2	15.0	11.4	11	120	2.5		20	TR	17.5							Drill POOH to core.	
53	5.	2512	1.60	50	20.5	17	7	2	5.0	2	15.0	11.3	10	160	2.0		20	TR	17.5							Lost corebit. Milling.	
54	6.	2512	1.60	51	21.5	17	7	2	5.0	1	15.6	11.3	10	140	1.6		20	TR	20.0							RIH w/junk basket	
55	7.	2512	1.60	51	24	20	8	2	4.5	1	15.0	11.5	10.5	140	3.1		21	TR	20.0							POOH, logg.	
56	8.	2512	1.60	51	23.5	20	7	2	4.8	1	15.2	11.5	10.2	140	1.7		21	.3	20.0							Logging.	
57	9.	2512	1.60	53	20.5	22	7	2	4.8	1	15.2	11.5	10.2	140	1.7		21	.3	20.0							Milling.	
									4.9	1	15.1	11.4	10	140	1.6		20	.3	20.0								Mill and fish for
									4.4	1	15.0	11.3	10.2	140	2.9		20	.3	20.0								junk.
															1.5		20	.3	20.0								Change BHA, RIH
															3.1		20	.3	20.0								w/junk basket.

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			DENSITY PPG <input type="checkbox"/> SG <input checked="" type="checkbox"/>	VISCOSITY				GELS 0	FLUID LOSS 30 Min cc's	CAKE 32 nds	H.T.H.P. cc's	PH	Filtrate Analysis			RETORT			BENTONITE #/BBL	POTASH #/BBL		POLYMER #/BBL	"N"	"K"			
				sec/qt	A.V. cps	P.V. cps	Y.P. #/100 sq.ft.						10	Cl ⁻ ppm	Ca. ++ ppm	Py	% OIL	% SOLIDS							% SAND		
58	10.	2524	1.60	52	24.5	20	9	2	11	4.1	1	14.5	11.4	10	150	1.4	2.7	20	.3	20.0							Fish w/RCB, pump slug.
59	11.	2544	1.60	50	22	19	7	2	10	4.8	2	15.6	11.4	9	130	1.8	3.4	19	.25	20.0							Drill POOH, testing BOP.
60	12.	2574	1.60	54	24.5	21	8	2	10	4.3	1	15.3	11.4	9	130	1.4	2.7	19	.25	20.0							RIH Drilling.
61	13.	2649	1.60	53	24.5	21	7	2	9	3.7	1	14.5	11.3	9	120	1.5	2.9	20	.25	20.0							Drill POOH, change bit, RIH.
62	14.	2705	1.60	53	24.5	21	7	2	7	3.8	1	13.6	11.4	9	130	1.7	3.3	20	TR	20.0							Drill POOH, change bit, RIH, drill.
63	15.	2749	1.60	53	23	20	6	2	7	3.5	1	13.3	11.5	9	120	2.1	3.7	19	.25	20.0							Drill POOH, changed bit, RIH.
64	16.	2802	1.60	49	22.5	19	7	2	7	3.8	1	13.5	11.5	9	120	1.5	2.9	19	TR	20.0							Drilling.
65	17.	2802	1.80	55	26	21	12	2	12	3.7	1	13.8	11.3	9	130	1.7	3.3	20	.25	20.0							Cmt. plug no. 1 and 2.
66	18.	2802	1.80	56	28	23	10	3	29	4.1	1	14.2	11.3	8.5	120	1.4	2.7	25	.3	20.0							Squeeze cement.
67	19.	2802	1.80	60	31	26	10	3	27	4.2	1	14.5	11.0	8.7	120	1.35	2.6	24.5	.25	20.0							Perforate, cement perforations.
68	20.	2802	1.80	60	33	28	10	4	32	4.9	2	15.0	10.8	9	150	1.8		25	.5	20.0							Drill cement.
69	21.	2802	1.80	57	29	25	8	3	27	5.1	2	14.6	10.5	8.7	150	1.6		25	.5	20.0							Test csg., cement leaking zone.
70	22.	2802	1.80	60	33	28	12	3	36	5.2	2	15.0	10.7	8.8	180	1.8		25	.3	20.0							Cmt. perforated zone.
71	23.	2802	1.80	58	32	27	10	3	34	5.0	2	15.0	10.7	8.8	200	1.85		25	.5	20.0							Squeeze cement into perforated zone.
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			DENSITY PPG <input type="checkbox"/> SG <input checked="" type="checkbox"/>	VISCOSITY				GELS 0	FLUID LOSS 30 Min cc's	CAKE 32 nds	H.T.H.P. cc's	PH	Filtrate Analysis			RETORT			BENTONITE #/BBL	POTASH #/BBL	POLYMER #/BBL	"N"		"K"	
				sec/qt	A.V. cps	P.V. cps	Y.P. #/100 sq.ft.						Ca. ++ ppm	PI/MF	% OIL	% SOLIDS	% SAND								
	1979																								
72	24.	2802	1.80	52	28.5	24	9	3	34	5.3	2	15.5	10.5	9	180	1.8	25	.5	20.0						Run packer, perforate
73	25.	2802	1.80	51	27	23	8	3	32	5.4	2	15.5	10.5	9	180	1.7	25	.5	20.0						RIH w/test string.
74	26.	2802	1.79	55	31	26	11	5	35	5.5	2		10.7	9	180	1.7	25	.5	20.0						Testing.
75	27.	2802	1.80	53	27.5	23	9	5	34	5.6	2		10.6	8	190	1.3	25	.5	20.0						Run junk basket, circ. and squeeze. Drill cement plug, logg.
76	28.	2802	1.80	57	30	25	10	5	35	5.6	2		10.8	8	200	1.4	25	.5	20.0						logg.
77	29.	2802	1.80	56	30.5	25	11	6	35	5.8	2		10.8	8	200	1.3	25	.5	20.0						Squeeze, cement
78	30.	2802	1.80	55	30	25	10	5	34	5.7	2		10.8	8	180	1.4	25	.5	20.0						Cement squeeze o.k.
79	31.	2802	1.80	53	26.5	22	9	4	33	5.2	2		10.9	8	120	1.6	25	.5	20.0						Testing.
80	1.6	2802	1.80	53	26	22	8	4	32	5.2	2		10.8	8	120	1.5	25	.5	20.0						Prod. testing.
81	2.	2802	1.80	51	25	20	10	4	32	5.1	2		11.1	8	120	1.6	25	.5	20.0						Set plug.
82	3.	2802	1.79	49	24	20	8	4	32	5.1	2		11.0	8	120	1.6	25	.5	20.0						Run test string.
83	4.	2802	1.77	47	22	17	10	3	28	5.2	2		10.9	8	150	1.4	25	.5	20.0						Weight reduction due to leakage.
84	5.	2802	1.80	49	24	20	8	3	28	5.2	2		11.0	8	120	1.4	25	.5	21.0						Prepair for squeeze cmt.
85	6.	2802	1.80	45	22	19	6	3	26	5.3	2		11.0	8	130	1.4	25	.5	21.0						Hole plugged.
REMARKS																									

Drilling Fluid & Material Consumption Report

MUD SYSTEM LIGNOSULFONATE/BENTONITE

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Day No.	DATE	ESTIMATED DAILY MUD VOLUMES			BULK MATERIALS			SACK MATERIALS		MATERIALS ADDED TO CONTROL PROPERTIES															
		LOSSES SUB SURFACE	LOSSES SURFACE	VOLUME MUD BUILT	BARITE BULK	BENTONITE BULK	BENTONITE	CAUSTIC SODA	LIGNOSULF.	THINNERS	DRISPAC SL	CMC	DRISPAC P	POLYMERS	LIME	SODA ASH	BICARB.	OTHERS							
43	25.																								
44	26.		45		15				23																
45	27.		80																						
46	28.		313	330			120	7	12								4								
47	29.						5	8	20				6					3							
48	30.								36				10												
49	1.5			70	7																				
50	2.				6								2												
51	3.				1		4		1				5												
52	4.						6		3																
53	5.						20	1	2				1												
54	6.																								
55	7.																								
56	8.												2												
FORWARD		4592	3445	10075	714	50	794	275	499				34	73	4		13	9	2						
ESTIMATED TOTALS		4592	3883	10475	743	50	949	291	596				37	96	4		13	13	5						
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		LOSSES-SUB SURFACE	LOSSES SURFACE	VOLUME MUD BUILT	BARITE BULK	BENTONITE BULK	BENTONITE	CAUSTIC SODA	LIGNOSULF.	THINNERS	DRISPAC SL	CMC	DRISPAC R	POLYMERS	LIME	SODA ASH	BICARB.	OTHERS								
57	9.		60		11	10					3															
58	10.				6	11	1	10																		
59	11.			30	16	11	5	1																		
60	12.			60	5	29	8	1			1	1														
61	13.			73	7	12	6	59				13														
62	14.		50	70	7		6	12																		
63	15.				2		6																			
64	16.				7						1															
65	17.		100		10	3					6															
66	18.			100	70	18					2															
67	19.	40			14	2					1															
68	20.		60		4	3	2																			
69	21.				10		4				1															
70	22.		80		24	12	4				1													1		
FORWARD		4592	3883	10475	743	50	949	291	596			37	96	4										13	13	5
ESTIMATED TOTALS		4632	4233	10808	936	50	1060	333	679			53	110	4										13	13	6
REMARKS:																										

V TESTING OPERATIONS
AND RESULTS

TESTING OPERATIONS AND RESULTS

1. DST operations

34/10-3 was the second well drilled in the Delta area in block 34/10. In the first well, 34/10-1, hydrocarbons were tested and proven to be present throughout the Brent sand. Testing indicated high productivity and good reservoir characteristics but also problems with sand production.

The purpose of testing 34/10-3 were therefore to:

- confirm continuity of pressure, temperature, reservoir characteristics and quality of reservoir fluid from 34/10-1 to the 34/10-3 fault block.
- investigate sand production and sand strenght on more details
- obtain sample of formation water

The test analysis is based on Statoil test analysis program package.

Comment:

The quality of the DST-data are not satisfactory because the tests were designed and carried out as sand tests. Conventional test analysis are uncertain when applied as such data and the results can therefore only be used as an indication of the reservoir properties.

DST summary data

Test results

DST no. 1: Performation: 1965 - 1970 m MSL
(1990 - 1995 m RKB) Ref: ISF/SONIC

Flow data (main flow periods):

Choke size 1/64"	Oil water rate m ³ /d (STB/d)	BHP at 1948 M MSL bar (psi)
12	155 (970)	312.5 (4533)
14	170 (1080)	313.7 (4550)
16	255 (1600)	312.9 (4539)
16 + 8	320 (2000)	313.8 (4552)
20	420 (2600)	314.9 (4568)

Extrapolated reservoir pressure: 317.6 bar (4606 psi) at 1948 m MSL

Max. recorded temperature: 75.5°C (168°F at 1948 m MSL

Permeability: k = 1500 mD

Water density: 1.0294 gr/cc at 15°C

DST no. 2:

Performation: 1910 - 1915 m MSL

(1935 - 1949 m RKB) Ref: ISF/SONIC

Flow data (main flow periods):

Choke size 1/64"	Oil/water rate m ³ /d (STB/d)	Gas rate 10 ³ Nm ³ /d 10 ³ scf/d	GOR Nm ³ /m ³ (scf/STB)	BHP at 1890 m MSL bar (psi)
10	70(450)			311.3(4515)
12	120(750)			310.5(4503)
14	160(1000)			309.1(4483)
16	190(1200)	14.9(550)	78(460)	309.8(4493)
16+8	240(1500)	17.6(648)	73(430)	309.2(4485)
20	320(2000)	23.5(870)	74(435)	307.7(4463)
20+10	400(2500)	27.7(1020)	70(410)	307.3(4457)
20+14	450(2850)	31.7(1167)	70(410)	306.2(4440)

Extrapolated reservoir pressure: 315.5 bar (4547 psi) at 1890 m MSL

Max. recorded temperature: 72°C (162°F) at 1890 m MSL

Permeability: k = 3000 mD

Oil gravity: 29.9 API^o

Gas sp. gr. 0.656 (Air = 1)

DST no. 3:

Performation: 1870 - 1875 m MSL

(1895 - 1900 m RKB) Ref. ISF/
SONIC

Flow data (main flow periods):

Choke size 1/64"	Oil/water rate m ³ /d (STB/d)	Gas rate 10 ³ Nm ³ /d(10 ³ scf/d)
10	(650)	not measured

Extrapolated reservoir pressure: 308.2.bar (447 psi) at 1846 m MSL

Max. recorded temperature: 69.5°C (157°F) at 1846 m MSL

Permeability: k = 50 - 70 mD

Oil gravity: 29 API^o

2. RFT operations

Repeat formation tester was run during the final logging through Brent and Dunlin formations at April 17th, 1979.

37 pressure tests were made (26 in Brent and 11 in Dunlin Formation)

The test program included one segregated sample to check for oil/water contact and one segregated sample in the oil zone. Because of problems with sand plugging the probe in the zones of interest (while pressure testing), no attempt was made to collect samples.

2 Amerada pressure gauges were run with the RFT. The pressure readings from these gauges are very scattered and can not be used in any analysis. It seems, however, that the Amerada pressures are higher (varying from 0 to 100 psi) than the RFT pressures.

No RFT was run in the Statfjord Formation.

3. RFT results and analysis

- Temperature and pressure corrections:

The calibration certificate for the RFT tool used is dated June-76. Since the tool has not been calibrated for 3 years, Schlumberger does not recommend to include their corrections. The tool was, however, calibrated vs. dead weight tester (at room temperature) one week before the test was run. At the pressure range of interest the RFT pressure was only 1 or 3 psi lower than the DWT pressure.

Based on this no corrections are made.

RFT results and analysis

Test no.	Depth (m MSL)	P-hyd(psig) Before/after	Set time (mins)	P-final (psig)	Remarks
1	1907.5	4807/4803	2½	4531	
2	2229	5615/5617	4½	5061	long build up
3	2215	5583/5575	10	5011	long build up
4	2214.5	5577/5573	½		tight
5	2206.5	5551/5549	3	4971	
6	2199.5	5531/5525	6	4957	long build up
7	2191.5	5505/5503	5	4958	long build up
8	2192	5505/5503	5½	4922	long build up
9	2188.5	5495/5492	3	4933	
10	2182	5475/5473	3	4921	
11	2180	5468/5466	3	4918	
12	2177.5	5458/5458	4	4910	
13	2055	5167/5164	4	4734	
14	2050	5154/5151	3	4727	
15	2042	5134/5132	3½	4716	
16	2033	5113/5109	3	4702	
17	2020	5079/5076	4	4682	
18	2012.5	5061/5058	4	4672	
19	1997	5025/5023	4	4647	long build up
20	1991	5008/5007	4	4643	
21	1982	4988/4986	3½	4633	
22	1977	4972/4971	4	4622	
23	1969	4947/4945	3½	4605	
24	1870	4714/4711	3½	4485	long build up*
25	1872	4719/4715	5	4493	long build up*
26	1875.5	4724/4726	4½	4501	
27	1893	4773/4766	3	4519	
28	1895	4773/4771	3½	4520	
29	1903	4789/4787	3½	4527	decreasing pressure*
30	1910	4804/4803	3	4537	
31	1914	4817/4813	3	4537	
32	1925	4845/4841	4	4549	
33	1928.5	4851/4847	4	4555	long build up*
34	1936	4871/4865	4	4559	
35	1944	4885/4883	3	4567	
36	1956	4920/4911	4	4582	
37	1972	4956/4950	3½	4605	

*Not included in analysis