8.4 Pressure sampling data

8.4.1 12 1/4" Section

MD	TVD	Gauge Temp.	DD volume	DD Time	FRA Mobility	Mud Pressure Before	Min. Flowing Pressure	Formation Pressure	Comments
(m)	(m)	(C°)	(cc)	(sec)	(mD/cp)	(bara)	(bara)	(bara)	
3294.4	3294.4	104.4	2.6	217.9	7.8	524.266	410.358	453.491	Good test
3294.4	3294.4	105.6	4.8	690.4	3.1	524.266	386.547	453.481	Repeat test
3294.4	3294.4	106.3	4.6	1249.3	2.6	524.266	387.059	453.476	Repeat test
3292.3	3292.3	107.7	4.6	701	5.1	524.126	412.543	452.365	Good test
3292.3	3292.3	107.9	4.6	996.1	5	524.126	413.252	452.383	Repeat test
3292.3	3292.3	108.1	4.6	1322.4	5.1	524.126	413.523	452.388	Repeat test
3274	3274	109.1	3.6	202.6	1.8	521.181	353.349	451.093	Good test
3274	3274	109.4	3.7	742.1	1.7	521.181	350.206	451.067	Repeat test
3274	3274	109.6	3.6	1332.9	1.3	521.181	353.053	451.059	Repeat test
3274	3274	109.8	3.7	2011.5	1.3	521.181	350.797	451.051	Repeat test
3274	3274	110	3.9	2701	1.2	521.181	347.802	451.043	Repeat test
3272	3272	110.1	N/A	N/A	N/A	520.897	N/A	N/A	Tight test
3271.8	3271.8	110.5	N/A	N/A	N/A	520.94	N/A	N/A	Tight test
3153.8	3153.8	109.3	3.7	256.6	2.3	502.538	371.472	444.049	Good test
3153.8	3153.8	109.1	3.8	699.1	7.5	502.538	370.244	444.02	Repeat test
3153.8	3153.8	109	3.5	914.3	2.1	502.538	371.665	444.027	Repeat test
3153.8	3153.8	108.9	3.7	1127.6	2.3	502.538	371.705	444.039	Repeat test
3153.8	3153.8	108.8	3.7	1377.3	2.1	502.538	371.587	444.043	Repeat test
3152.9	3152.9	108.5	3.6	857.8	1.6	502.359	347.829	443.944	Good test
3152.9	3152.9	108.4	3.9	1572.6	1.5	502.359	337.408	443.938	Repeat test
3152.9	3152.9	108.4	3.6	2025.6	1.5	502.359	345.303	443.938	Repeat test
3046.2	3046.2	107.6	N/A	N/A	N/A	485.685	N/A	N/A	Tight test
3044.7	3044.7	106.7	N/A	N/A	N/A	485.407	N/A	N/A	Tight test
3313.2	3313.2	108.1	N/A	N/A	N/A	527.507	N/A	N/A	Tight test
3311.2	3311.2	110.3	3.6	133.3	11.2	527.025	436.576	456.71	Good test
3311.2	3311.2	110.6	3.6	403.3	12	527.025	437.091	456.699	Repeat test
3311.2	3311.2	111	3.8	601.8	10.7	527.025	436.09	456.724	Repeat test
3311.2	3311.2	111.3	3.8	908.6	12	527.025	437.418	456.736	Repeat test
3311.2	3311.2	111.6	3.7	1311.4	11.3	527.025	435.581	456.753	Repeat test
3308.5	3308.5	111.8	N/A	N/A	N/A	526.73	N/A	N/A	Tight test
3306.3	3306.3	112.9	3.6	291.8	1.5	526.45	347.199	456.914	Good test
3306.3	3306.3	113.2	3.7	964.5	1.3	526.45	352.284	456.867	Repeat test
3306.3	3306.3	113.4	3.7	1792	2.9	526.45	355.553	456.841	Repeat test
3306.3	3306.3	113.6	3.6	2817.5	6.2	526.45	362.182	456.828	Repeat test

MD	TVD	Gauge Temp.	DD volume	DD Time	FRA Mobility	Mud Pressure Before	Min. Flowing Pressure	Formation Pressure	Comments
(m)	(m)	(C°)	(cc)	(sec)	(mD/cp)	(bara)	(bara)	(bara)	
3298.2	3298.2	114.4	4.2	652.9	3.8	525.237	336.799	453.488	Good test
3298.2	3298.2	114.5	3.6	1693.8	2.9	525.237	394.209	453.489	Repeat test
3282	3282	115	9.5	516.1	12.2	522.67	406.915	450.12	Good test
3282	3282	115	9.6	1146.9	10.9	522.67	403.079	450.128	Repeat test
3282	3282	115	9.7	1450.3	10.6	522.67	401.359	450.137	Repeat test
3282	3282	115	9.7	1690.8	10.5	522.67	399.558	450.143	Repeat test
3282	3282	115	9.7	1963.6	9.8	522.67	399.567	450.146	Repeat test
3260.6	3260.6	115.1	N/A	N/A	N/A	519.367	N/A	N/A	Tight test
3254.8	3254.8	115	N/A	N/A	N/A	518.549	N/A	N/A	Tight test
3247.3	3247.3	115.1	N/A	N/A	N/A	517.243	N/A	N/A	Tight test
3239.6	3239.6	115	N/A	N/A	N/A	516.011	N/A	N/A	Tight test
3232.6	3232.6	114.9	N/A	N/A	N/A	514.958	N/A	N/A	Tight test
3230.2	3230.2	114.3	2.4	742	7.1	514.616	371.224	450.578	Good test
3230.2	3230.2	114.2	2.5	1902	7.2	514.616	362.738	450.535	Repeat test
3209.5	3209.5	114	N/A	N/A	N/A	511.578	N/A	N/A	Tight test
3194.9	3194.9	113.8	10	167.6	38.1	509.202	426.62	447.657	Good test
3194.9	3194.9	113.7	9.7	358.1	34.8	509.202	426.294	447.681	Repeat test
3194.9	3194.9	113.7	9.8	575.6	34.6	509.202	425.825	447.704	Repeat test
3194.9	3194.9	113.6	9.9	742.9	34.1	509.202	425.512	447.713	Repeat test
3194.9	3194.9	113.4	9.7	1109.6	41	509.202	395.989	447.707	Repeat test
3171.3	3171.3	113.1	N/A	N/A	N/A	505.566	N/A	N/A	Tight test
3160.3	3160.3	112.8	N/A	N/A	N/A	503.764	N/A	N/A	Tight test
3158.2	3158.2	112.3	N/A	N/A	N/A	503.53	N/A	N/A	Tight test
3051.9	3051.9	110.5	4.6	259.9	61.6	486.858	416.54	420.915	Good test
3051.9	3051.9	110.4	4.4	407.9	70.9	486.858	416.89	420.922	Repeat test
3051.9	3051.9	110.3	4.5	453.9	70.4	486.858	417.06	420.933	Repeat test
3051.9	3051.9	110.2	4.6	519.4	68.2	486.858	417.113	420.944	Repeat test
3049.8	3049.8	109.7	N/A	N/A	N/A	486.632	N/A	N/A	Tight test
3040.5	3040.5	109.2	N/A	N/A	N/A	485.057	N/A	N/A	Tight test

8.4.2 8 ½" Section

MD	TVD	Gauge Temp.	DD volume	DD Time	FRA Mobility	Mud Pressure Before	Min. Flowing Pressure	Formation Pressure	Comments
(m)	(m)	(C°)	(cc)	(sec)	(mD/cp)	(bara)	(bara)	(bara)	
3751.00	3751.00	130.80	N/A	N/A	N/A	551.34	N/A	N/A	Tight Test
3751.00	3750.90	131.00	N/A	N/A	N/A	551.18	N/A	N/A	Tight Test
3751.20	3751.10	131.20	N/A	N/A	N/A	550.99	N/A	N/A	Tight Test
3756.00	3755.90	131.40	N/A	N/A	N/A	551.79	N/A	N/A	Tight Test
3757.50	3757.40	131.60	N/A	N/A	N/A	551.88	N/A	N/A	Repeat Test
3765.00	3764.90	132.30	1.90	1786.30	0.80	553.27	429.31	494.75	Good Test
3765.00	3764.90	132.40	1.90	2287.80	0.70	553.27	428.44	494.72	Repeat Test
3765.00	3764.90	132.40	1.90	2833.80	0.50	553.27	428.19	494.69	Repeat Test
3765.00	3764.90	132.50	1.90	3392.40	0.60	553.27	429.01	494.67	Repeat Test
3767.00	3766.90	132.60	1.80	204.90	1.00	553.15	434.78	494.10	Good Test
3767.00	3766.90	132.60	1.80	444.40	1.00	553.15	435.38	493.94	Repeat Test
3767.00	3766.90	132.70	1.90	850.10	0.90	553.15	435.21	493.90	Repeat Test
3767.00	3766.90	132.70	1.90	1251.00	0.90	553.15	434.88	493.90	Repeat Test
3780.50	3780.40	132.80	N/A	N/A	N/A	555.68	N/A	N/A	Tight Test
3781.00	3780.90	133.00	N/A	N/A	N/A	555.51	N/A	N/A	Tight Test
3786.00	3785.90	133.10	N/A	N/A	N/A	556.31	N/A	N/A	Tight Test
3788.00	3787.80	133.30	N/A	N/A	N/A	556.54	N/A	N/A	Tight Test
3801.00	3800.80	133.40	N/A	N/A	N/A	558.75	N/A	N/A	Tight Test
3814.50	3814.30	134.30	N/A	N/A	N/A	560.20	N/A	N/A	Tight Test
3815.50	3815.30	134.60	N/A	N/A	N/A	560.32	N/A	N/A	Tight Test
3820.00	3819.80	134.70	N/A	N/A	N/A	561.09	N/A	N/A	Tight Test
3825.00	3824.80	134.80	N/A	N/A	N/A	561.82	N/A	N/A	Tight Test
3827.00	3826.80	134.90	N/A	N/A	N/A	562.07	N/A	N/A	Tight Test
3839.40	3839.20	135.10	2.30	226.30	1.40	564.18	403.93	503.66	Good Test
3839.40	3839.20	135.10	2.30	473.40	1.40	564.18	420.14	503.49	Repeat Test
3839.40	3839.20	135.20	2.40	814.50	0.90	564.18	420.15	503.49	Repeat Test
3842.50	3842.30	135.30	N/A	N/A	N/A	564.24	N/A	N/A	Tight Test
3846.50	3846.30	135.50	2.40	624.90	1.70	564.90	427.41	503.29	Good Test
3846.50	3846.30	135.50	2.40	855.40	1.70	564.90	428.51	503.28	Repeat Test
3846.50	3846.30	135.50	2.40	1095.50	2.40	564.90	427.95	503.28	Repeat Test
3860.50	3860.30	135.70	2.50	138.00	5.90	567.11	447.50	505.65	Good Test
3860.50	3860.30	135.70	2.50	227.80	5.90	567.11	448.15	505.60	Repeat Test
3860.50	3860.30	135.80	2.50	312.10	6.00	567.11	448.62	505.60	Repeat Test

MD	TVD	Gauge Temp.	DD volume	DD Time	FRA Mobility	Mud Pressure Before	Min. Flowing Pressure	Formation Pressure	Comments
(m)	(m)	(C°)	(cc)	(sec)	(mD/cp)	(bara)	(bara)	(bara)	
3864.00	3863.80	136.00	6.10	191.30	42.70	567.54	471.41	505.85	Good Test
3864.00	3863.80	136.00	6.10	255.80	50.30	567.54	476.40	505.86	Repeat Test
3868.50	3868.30	136.20	6.20	152.80	64.10	568.19	482.95	506.28	Repeat Test
3868.50	3868.30	136.20	6.10	199.00	64.60	568.19	482.93	506.27	Repeat Test
3881.00	3880.80	136.40	N/A	N/A	N/A	570.27	N/A	N/A	Tight Test
3881.50	3881.30	136.80	N/A	N/A	N/A	570.06	N/A	N/A	Tight Test
3901.20	3901.00	136.90	N/A	N/A	N/A	573.58	N/A	N/A	Tight Test
3902.00	3901.80	137.20	N/A	N/A	N/A	573.36	N/A	N/A	Tight Test
3953.40	3953.10	139.30	2.50	496.60	6.00	581.12	436.96	493.23	Good Test
3953.40	3953.10	139.30	2.50	875.80	6.00	581.12	437.45	493.22	Good Test
3953.40	3953.10	139.40	2.60	1082.50	6.60	581.12	437.36	493.21	Repeat Test
3990.80	3990.50	139.70	N/A	N/A	N/A	587.16	N/A	N/A	Tight Test
3992.20	3991.90	140.70	2.40	1111.60	1.20	587.08	413.02	495.92	Good Test
3992.20	3991.90	140.90	2.40	1728.50	1.10	587.08	413.01	495.89	Repeat Test
3996.40	3996.10	141.00	N/A	N/A	N/A	586.77	N/A	N/A	Tight Test
3983.50	3983.20	141.20	N/A	N/A	N/A	584.48	N/A	N/A	Still Building
3979.00	3978.70	141.30	N/A	N/A	N/A	583.77	N/A	N/A	Tight Test
3992.20	3991.90	141.50	2.40	399.60	0.50	586.54	355.81	496.02	Good Test
3992.50	3992.20	141.60	N/A	N/A	N/A	585.95	N/A	N/A	Tight Test

8.5 Fluid Sampling Data

8.5.1 12 ¼" Section

MD	TVDBRT	Temperature	Pump out Volume	Pump out Time	Reservoir Pressure	Minimum Flowing Pressure	Tank Closing Pressure	Tank Type	Density	GOR	Expected Fluid
m	m	C°	ltr	min	bar	bar	bar		g/cc	scf/stb	
3051.9	3051.9	100.52	116	178	420.87	327	710.452	SPT1	0.94	n/a	Water
3194.9	3194.9	111.73	110.28	167	447.50	223	736.580	SPT1	0.93	n/a	Water
3153.8	3153.8	113.9	21.28	186	444.05	233	733.58	SPT1	0.75-0.8	- *	Oil
		113.79	21.78	2001	444.05	233	733.58	SPT1	0.75-0.8	- *	Oil
3282	3282	115.59	22	317	450.325	242.75	782.53	SPT1	0.90-0.95	n/a	Water
3311.2	3311.2	119.2	22.5	81	456.78	251.96	798.20	SPT1	0.90-0.96	n/a	Water

* GOR reading not accurate due to slugging.

8.5.2 8 ½" Section

MD	TVD BRT	Temp.	Pump out Volume	Pump out Time	Reservoir Pressure	Minimum Flowing Pressure	Tank Closing Pressure	Tank Type	Density	Sound Speed	GOR	Expected Fluid
m	m	C°	ltr	min	bar	bar	bar		g/cc	us/ft	scf/stb	
3955.19	3954.92	141.1	39.67	229	493.266	357.630	863.305	SPT1	0.9	190	n/a	Water
3868.48	3868.28	139.9	116.03	190	506.168	415.171	861.147	SPT1	0.9	190-195	n/a	Water
		139.9	123.01	204	506.168	415.171	855.113	SPT1	0.9	190-195	n/a	Water
3860.52	3860.32	138.9	39.84	262	505.631	272.626	856.333	SPT1	0.9	190-195	n/a	Water

8.5.3 Summary of Compositional Results - Fluid Samples

Bottle no	Sampling depth mMD	GOR Sm3/Sm3	Density of stock tank oil kg/Sm3	Molecular weight of stock tank oil	Gas gravity	Mud filtrate Contamination Wt % in STO
TS-101706	3153.8	74.3	841.3	244.4	0.704	41.5
TS-170303	3153.8	76.9	842.2	244.9	0.703	40.0

Single Stage Separation of RCI oil samples, uncorrected for mud filtrate contamination

Bottle no	Sampling depth mMD	GOR Sm3/Sm3	Density of stock tank oil kg/Sm3	Molecular weight of stock tank oil	Gas gravity
TS-101706	3153.8	129.4	856.7	261.4	0.704
TS-170303	3153.8	130.4	857.3	261.3	0.703

Single Stage Separation of RCI oil samples, corrected for mud filtrate contamination

Bottle no	Sampling depth mMD	GWR Sm3/Sm3	Density of stock tank water kg/Sm3	Water volume @SC cc	Gas volume @ SC ccy	Gas gravity
TS-88604	3311.2	0.9	1021.8	464.9	437.7	0.929
TS-101404	3860.5	4.4	1014.6	513.9	2275.2	1.113

Single stage separation of RCI water samples

8.5.4 SWC Plug Measurements

Depth (m)	Porosity (%)	Gr.Dens (g/cc)	Water (ml)	Sw (%)	Perm:Kg(mD)	Perm:1/Pm	Perm:Kl(mD)	
3153.80	19.4	2.67	1.1	43.2	NMP		NMP	
3306.20	9.3	2.64	2.1	54.0	0.097	0.446	0.057	
3392.30	19.7	2.66	2.6	51.2	30.1	0.894	25.2	
3281.10	17.1	2.64	2.2	46.9	346	0.989	320	
3272.00	13.8	2.66	3.8	52.7	0.893	0.447	0.603	
3255.00	18.2	2.66	3.9	50.2	3.71	0.479	2.98	
3230.10	16.9	2.57	4.9	59.3	0.355	0.447	0.227	
3209.40	16.5	2.66	3.6	51.7	0.450	0.439	0.291	
3194.90	NPP	NBPP	NPP	NPP	NPP		NPP	
3170.70	12.3	2.68	3.3	57.2	0.251	0.446	0.157	
3110.00	NPP	NBPP	NPP	NPP	NPP		NPP	
3052.50	18.9	2.66	5.0	49.3	183	0.962	166	
3046.50	19.8	2.66	3.5	49.6	0.514	0.445	0.336	
3040.50	15.3	2.65	3.2	42.9	0.207	0.445	0.128	
3995.50	10.9	2.68	1.3	30.3	0.031	0.447	0.017	
3991.00	11.5	2.65	1.2	27.2	0.226	0.447	0.140	
3990.00	NMP	1.33	0.4	NMP	NMP		NMP	Coal
3986.50	1.8	2.63	0.8	97.7	0.011	0.444	0.006	
3983.50	14.3	2.66	0.3	14.8	NMP		NMP	
3982.50	4.1	2.71	1.1	53.0	0.027	0.448	0.015	
3978.50	2.9	2.66	1.2	81.2	0.011	0.443	0.006	
3976.00	11.8	2.66	0.4	18.7	NMP		NMP	
3968.50	15.2	2.67	0.8	21.3	NMP		NMP	
3957.00	16.0	2.69	0.5	15.6	NMP		NMP	
3956.00	14.0	2.68	0.8	26.9	1.18	0.446	0.183	
3955.00	13.6	2.65	1.2	34.8	2.85	0.555	2.16	

Abbreviations:

NMP - No measurement possible
NPP – No plug possible

APPENDIX H DRILLING FLUIDS

H.1 36" Section

SECTION SYNOPSIS:

Section commenced drilling at 396 m and continued to 465m. Section was drilled using seawater and Pre-Hydrated Bentonite sweeps at mid stand and at connection, the hole was drilled and cleaned effectively.

At section TD, 2 x 20 m3 Hi-Vis sweeps were pumped and the hole was displaced to 1.50 sg weighted kill mud. A wiper trip to seabed and back to TD was made and no fill was observed. The hole was topped up on the way, and the rig up for running conductor commenced.

Time had to be taken to avoid building angle while drilling. Hi-Vis sweeps successfully swept the hole clean which was seen clearly on the wiper trip and the 30" conductor which ran smoothly to the hole bottom.

3.1.1 Mud Properties/Drilling Fluid Technical Performance

Mud Property	Unit	Programmed	Minimum	Maximum	Average
Density	sg	1.05 – 1.50	1.05	1.50	1.05
Funnel Vis	s/quart	>100	105	155	130
Plastic Viscosity	cP	-			
Yield Point	lb/100 ft^2	-			
API Fluid loss	Cc	< 10	6	6	6
3 Reading	lb/100 ft^2	-			
10 Min gel	lb/100 ft^2	> 10			

Table: Important Drilling Fluid Properties

DRILLING FLUID TECHNICAL PERFORMANCE	
MUD DENSITY (sg):	1.05 sg sweeps, 1.50 sg displacement/kill mud
CONTAMINATION:	N/A
INHIBITION:	N/A
SOLIDS CONTROL EQUIPMENT:	All returns to seabed.
HOLE CLEANING:	No fluids related problems experienced while drilling/tripping or running conductor.
LOST CIRCULATION INCIDENTS: (PILLS PUMPED & CONCENTRATIONS):	No
HOLE CONDITION :	Hole condition was generally very good during the drilling phase. No over-pull seen when pulling out.
CEMENTING:	

H.2 9 7/8" Pilot Hole

SECTION SYNOPSIS:
Drilling of the section commenced at 464 m, ending earlier than planned at 723 m, after shallow gas was observed.

Seawater and pre-hydrated Bentonite (PHB) sweeps were used for drilling this section, with Xanthan gum being used to give additional viscosity when required due to limited time to allow Bentonite to hydrate. 7 m3 sweeps were pumped at mid-stand and prior to making a connection whilst drilling. 75 kg/m3 yielded Bentonite combined with 1-2 kg/m3 of Xanthan Gum in drill water secured viscosity between 100 - 200sec/qt, whereas the displacement fluid was Aquadrill WBM. Initially this volume was made up of 1.50sg fluid and 1.12sg premix, as 1.50sg was required as kill fluid whilst the first 150m below seabed was drilled. After this the two fluids were blended to give 1.30sg as required for displacement at section T.D.

At 723m shallow gas was observed and the 1.3sg Aquadrill kill mud was pumped, the well was killed after 2x bottoms up had been pumped (although a total of 3x bottoms up were pumped in total). After this 5m3 of 1.90sg gas tight cement was pumped. This was later tagged at 699m, the well displaced to seawater and flow-checked and then displaced back to 1.30sg kill mud. This last displacement was made from new kill mud made up with Bentonite (20kg/m3) and Xanthan gum (5kg/m3) weighted with barite.

3.2.1 Mud Properties/Drilling Fluid Technical Performance

Mud Property	Unit	Programmed	Minimum	Maximum	Average
Density	sg	1.03 – 1.50	1.05	1.50	1.05
Funnel Vis	s/quart	>100	110	160	150
Plastic Viscosity	cP	-			
Yield Point	lb/100 ft^2	-			
API Fluid Loss (Aquadrill)	cc	>10	4	4	4
3 Reading (Aquadrill)	lb/100 ft^2	> 8	8	8	8
10 Min gel	lb/100 ft^2	-			

Table: Important Drilling Fluid Properties

DRILLING FLUID TECHNICAL PERFORMANCE	
MUD DENSITY (sg):	1.05 sg sweeps, 1.3 sg displacement mud, 1.50 sg and 1.30sg kill mud
CONTAMINATION:	N/A
INHIBITION:	N/A
SOLIDS CONTROL EQUIPMENT:	N/A. All returns to seabed.
HOLE CLEANING:	No fluids related problems experienced while drilling/tripping
LOST CIRCULATION INCIDENTS: (PILLS PUMPED & CONCENTRATIONS):	No
HOLE CONDITION :	Hole condition was good during the drilling phase. No over-pull seen when pulling out.
CEMENTING:	

H.3 26" Section

SECTION SYNOPSIS:
Due to the encounter of shallow gas on the 9 7/8" pilot hole it was decided to not use the RMR system. Instead Pre-Hydrated Bentonite was prepared for Hi-Vis sweeps together with Xanthan Gum/Drillwater/Seawater as Kill mud on this section. After drilling through cement, drilling continued into formation with 7 m3 sweeps pumped both at middle of stand and at connection, in order to maintain proper hole cleaning.

At TD, the well was swept with 2 x 15 m3 Hi-Vis pills and displaced to 1.30 sg mud, before pulling out with no tight spots observed. 20" casing was run and cemented successfully with hole in good condition.

3.3.1 Mud Properties/Drilling Fluid Technical Performance

Mud Property	Unit	Programmed	Minimum	Maximum	Average
Density	sg	1.05 – 1.30	1.05	1.30	1.05
Funnel Vis	s/quart	>100	170	200	200
Plastic Viscosity	cP	-			
Yield Point	lb/100 ft^2	-			
3 Reading	lb/100 ft^2	-			

Table: Important Drilling Fluid Properties

DRILLING FLUID TECHNICAL PERFORMANCE	
MUD DENSITY (sg):	1.05 sg pills and 1.30 sg kill mud
CONTAMINATION:	N/A
INHIBITION:	
SOLIDS CONTROL EQUIPMENT:	All returns to seabed meant no use for the solids control for this section.
HOLE CLEANING:	No fluids related problems experienced while drilling/tripping or running casing.
LOST CIRCULATION INCIDENTS: (PILLS PUMPED & CONCENTRATIONS):	No
HOLE CONDITION :	No fluids related problems experienced while drilling/tripping or running casing. Hole condition was generally very good during the drilling phase. No over-pull seen when pulling out.
CEMENTING:	20" casing was run and cemented successfully with hole in good condition.

H.4 17 ½" Section

SECTION SYNOPSIS:
The 17 1/2" clean out assembly was RIH and TOC was tagged at 660 m. Drilled out cement in 20" shoetrack with seawater, pumping Hi Vis pill when needed. 10 m before entering formation the well was displaced to 1.30 sg Aquadrill using a 20 m³ Hi Vis pill as a lead spacer prior to drilling float equipment and cement. Drilling commenced and float equipment, hard cement and formation were drilled down to 694 m. Due to cement being very hard only minor treatments with Citric Acid/Sodium Bicarbonate were necessary. A successful FIT to 1.40 sg was then performed and drilling commenced.

Drilled ahead, typically with ROP +/- 15-30 m/hr, 3900-4200 lpm flow rate. Encountered a sand zone at 1020 m which caused blinding of screens. Screened down from 200 mesh to 84/105 mesh. Commenced drilling and screening back up to 200 mesh. Sticky clay throughout the entire section, but appeared "dry" inside. Minimal losses over shakers where observed throughout the entire section, except for the sand zone at 1020m. Drilling continued down to TD (1575 m). The well was circulated clean (4 x Bottoms Up). A flow check was performed which revealed no volume instability and we began pulling out of hole wet. Pumped out of the hole to avoid swabbing the hole. Had to backream out due to tight spots on the way out. Fair amount of cuttings over the shakers over the entire interval while pulling out. Also had to bleed in premix to be able to maintain mudweight at 1.30 sg. Circulated 3 x Bottoms up inside the shoe to clean the hole. Flowchecked the well and pulled out of hole.

The 13 3/8" casing was run in hole, taking weight immediately when entering open hole. It was needed to circulate to pass area, and same scenario occurred at several tight spots towards TD. A failed attempt to land the casing at TD, led to pulling back casing to inspect liner hanger. A moderation of hanger seal assembly/liner hanger was performed and casing was landed successfully at TD. The casing was cemented and pressure tested to 355 bar prior to pulling out of hole. A couple of washing run and seal assembly run at wellhead was needed to get it pressure tested.

3.4.1 Mud Properties/Drilling Fluid Technical Performance

Mud Property	Unit	Programmed	Minimum	Maximum	Typical
Density	Sg	1.30	1.30	1.31	1.30
6 rpm reading	lbs/100ft²	10-16	8	11	10
3 rpm reading	lbs/100ft²	8-15	6	9	8
PV / YP	cP / lb/100 ft²	Alap / 20-40	14/26	18/31	17/29
Gel Strengths	lbs/100 ft²	<12 / <20	7/10	9/24	9/20
API Fluid Loss (100 psi)	ml/30 min	<4	3.5	4.1	3.9
LGS	%	<6	5	10	9
KCl	kg/m³	160 - 180	149	164	160

Table: Important Drilling Fluid Properties.

DRILLING FLUID TECHNICAL PERFORMANCE	
MUD DENSITY (sg):	1.30 sg. Bleeding in light premix most of the time while drilling to maintain MW.
CONTAMINATION:	Increasing level of drill solids in system throughout section.
INHIBITION:	Easily maintained with KCl, with values at 160-180 kg/m3
SOLIDS CONTROL EQUIPMENT:	4 x Swaco Shale Shakers. Paramount contribution in combating solids build-up.
HOLE CLEANING:	Satisfactory hole cleaning throughout drilling phase.
LOST CIRCULATION INCIDENTS: (PILLS PUMPED & CONCENTRATIONS):	None.
HOLE CONDITION:	Several tight spots worked through though, from 1400 m and upwards when pulling out.
CASING RUNNING / CEMENTING:	Casing was run to TD with several tight spots observed. Circulation was needed to pass this areas. Cement job performed without any issues.

H.5 12 ¼" Section

SECTION SYNOPSIS:
A 12 ¼" drilling BHA was run in hole and top of cement got tagged at 1518 m inside 13 3/8" casing. The cement was drilled out to above casing shoe using 1.30 sg Aquadrill WBM, circulated clean and waited on weather for bulk hose loading. After preparing the rig for OBM, the well was displaced to 1.55 sg Carbo-Sea OBM and drilling of the 17 ½" rat hole and 3 m new formation commenced to 1578 m. A Leak-of-test (LOT) was performed, giving a result of 1.90 sg EMW.

Drilling of 12 ¼" hole continued, while weighting up mud system to 1.58 sg, to 1680 m where a drilling break occurred, taking severe losses. Initial static loss at flow check was approximately 2 m^3/ hr and complete loss with no returns was observed when pumping at 1500 lpm. An LCM pill at 350 kg/m^3 of (100 kg/m^3 Flowcarb 1000, 100 kg/m^3 Flowcarb 500, 100 kg/m^3 Fordacal 36, 50 kg/m^3 Fordacal60) was pumped with static loss rate 2.6 m^3/hr decreasing to 1.3 m^3/hr. Another LCM pill with a 400 kg/m^3 concentration was spotted, with static loss rate 1.3 m^3/hr decreasing to 0.3 m^3/hr. No returns/partial returns were observed while displacing down the first two pills. A third pill (15 m^3 of 400 kg/m^3), was then mixed and displaced downhole with 300 lpm with 20% returns observed. POOH to 1616 m. Flow checked, well static.

A cement stinger was then RIH for a cement squeeze, pumping 12 m^3 of 1.90 sg cement. 3 m^3/hr downhole losses were observed while circulating bottoms up after cement job, diverting 6 m^3 of cement contaminated OBM to slop pit (slug pit).

The 12.25" BHA and run in hole and the mud weight was adjusted to 1.59 sg while circulating prior to drilling cement and while mixing a new LCM pill as requested from operator (340 kg/m^3, Flowcarb 1000, Flowcarb 500, LC-Lube, Mica Fine, Mica Medium, Chek Loss Plus, Soluflake Fine, Soluflake Medium). Cement was tagged at 1575 m and drilling of cement/new formation commenced. By 1750 m the system was weighted up to 1.60 sg. Higher than expected increase in rheology, significant drop in oil/water ratio and salinity suggested evidence of severe water contamination in active mud system. Most likely caused by a combination of factors: malfunctioning auto density meter consequently flushing water into pit while mixing/water intrusion from drilling cement/hosing with water at shakers/filling ditch with water in attempt to free blockage of cuttings screw consequently overflowing water into shaker pits/unknown source. 69 m^3 of Carbosea OBM was therefore backloaded to Viking Prince to free up pit space to be able to treat active with base oil rich premix in attempt to restore mud properties. The active system was treated with base oil rich premix (containing whole mud, base oil, carbogel/Rheoclay) to increase O:W ratio in addition to additions of CaCl2 salt to increase chlorides and Carbomul HT for emulsion and oil wetting of barite. Barite was at the same time dusted in to maintain mud weight. Drilling continued to 2450 m with typical parameters 2600-3000 lpm/294 bar, 4-13 kNm, ROP 20-50 m/hr. Good quality PDC shaped cuttings observed at shakers and general good hole condition indicated the drop in OW ratio and salinity (110 kg/m^3 initially) had no adverse effect on cuttings quality/hole condition. Treatments with base oil rich premix, CaCl2 salt and emulsifiers continued throughout the section.

From 2450 m, the rate of penetration was decreased to max 15 m/hr due to pump pop-offs. As bit indicated to be worn out after 9 days of drilling, decision was made to set an early TD of 3356 m, with drilling parameters towards end at 3 m/hr ROP, 2500-2600 lpm, torque of 8-15 kNm, WOB 12-20 ton and ECD 1.63 – 1.64 sg. Wireline logging commenced and lasted for approximately 5 days. During all logging runs no fill or tight spots were encountered and all tools ran to TD without problem. However due to the extended logging progam and a bad weather window approaching which would have stopped the casing running operation a decision was taken to perform a wiper trip. This proved to be a reasonable call as several tight spots were encountered while running in starting at 1711m where we took weight (3 tons). We rotated through and continued running in to 2401m where we took 17 tons down weight. Section was then worked several times but it still was not possible to pass so the Top Drive was picked up and we washed and reamed to TD. During the reaming operations small seepage losses were encountered. These amounted to 2-3 m^3 per day and did not cause us any undue problems. The casing was rigged up and run to setting depth of 3349m and other than an increasing loss rate no problems were encountered. Losses while running ranged from 600 ltrs per 5 joints to 1200 ltrs per 5 joints. Circulation then commenced and losses continued regardless of weather we were pumping or static. Static we were losing anything upto 1.6 m^3 per hour and dynamic @1000 ltrs/min pump rate losses of 400 ltrs and minute were recorded. At lower pump rates losses appeared to fall into the 100 – 125 ltrs a minute range. The decision was taken to cement and spacer was pumped (15 m^3) away with approximately 20% (3m3) returns seen at this stage. While pumping the cement (19.4 m^3) the returns dropped to around 12-14%. As we then displaced the cement with mud almost no returns were seen at the start of pumping but by the time we had pumped the displacement volume (113 m^3) we had approximately 35% returns which equated to 72m3 lost to the formation. Casing operations were then completed sucessfully and we moved on the preparations for drilling 8 ½" section.

Properties/ Drilling Fluid Technical Performance
CARBOSEA OBM had been selected for this section and provided excellent hole cleaning, hole condition, lubrication, inhibition and low HTHP fluid loss, despite initial issues with water contamination. OW ratio remained low, 60:40 after initial water contamination but was increased to 73:27 at end of section with treatments base oil rich premix throughout the section. However further water contamination during logging operations & then picking up water during cementing operations meant that O/W ratio was down to 68/32 after cementing the 9 5/8" casing. Salinity was low at start section (110 kg/m^3) and increased with additions of dry CaCl2 throughout the section (145 kg/m^3 at end of section). However, this had no adverse effects on hole condition/cuttings quality or other drilling parameters. All other properties were kept in spec throughout the section

Mud Rheology
Rheology was, as expected due to freshly mixed from town, low initially. The active was therefore treated with Carbogel/Rheoclay and emulsifier (Carbomul HT) while drilling the remainder of the cement/first 100 m of new formation. The rheology increased significantly due to water contamination/possibly also due to previous LCM pills pumped (as described under section synopsis), but was decreased and kept at low end of spec with oil rich premixes and/or Carbogel/Rheoclay. The mud rheology provided sufficient hole cleaning with ECD remaining constant at all times and pump pressures as expected.

Lost Circulation Materials
3 x LCM pill was pumped initially, showing some effect in static loss rate. LCM pills consisting of Fordacal/Flowcarb at 350 - 400 kg/m^3. A forth pill (340 kg/m^3) consisting of Flowcarb 1000/Flowcarb 500/LC Lube/Mica Fine/Mica Medium/Chek Loss Plus/Soluflake Fine/Soluflake Medium was mixed and kept in slug pit after cement squeeze job.

Solids Control
Shakers were dressed with 84 mesh screens initially and then changed for a combination of 200's and 230's for the remaining drilling of the section. At the flow rates used most of the time it was only necessary to use 2 shakers. LGS build up and sand content within the system was never an issue .

3.5.1 Mud Properties/Drilling Fluid Technical Performance

Mud Property	Unit	Programmed	Minimum	Maximum	Typical
Density	sg	1.55 – 1.60	1.55	1.60	1.60
6 rpm reading	lbs/100ft^2	12-18	4	20	9
3 rpm reading	lbs/100ft^2	8 - 15	3	18	8
PV / YP	cP / lb/100 ft^2	ALAP / 15-30	28/11	60/39	40/16
Gel Strengths	lbs/100 ft^2	<12 / <20	5/7	17/25	9/11
HTHP Fluid Loss (500 psi)	ml/30 min	<3	1.2	2.3	1.4
Chlorides	Kg/m^3	+/- 150	108	159	148
LGS	%	<6	0.7	4.5	2.8
ES	mV	> 500	267	650	590
O/W ratio		75:25 – 80:20	60:40	73:27	70:30

Table: Important Drilling Fluid Properties.

DRILLING FLUID TECHNICAL PERFORMANCE	
MUD DENSITY (sg):	1.55 – 1.60
CONTAMINATION:	Water contamination initially (see details under section synopsis)
INHIBITION:	Good, no issues. Good quality PDC shaped cuttings observed at shakers at all times.
SOLIDS CONTROL EQUIPMENT:	4 x Swaco Shale Shakers.
HOLE CLEANING:	Excellent throughout section.
LOST CIRCULATION INCIDENTS:(PILLS PUMPED & CONCENTRATIONS):	Severe downhole losses observed at drilling break at 1680 m (see details under section synopsis) Pill#1 – 3: 100 kg/m^3 Flowcarb 1000, 100 kg/m^3 Flowcarb 500, 100 kg/m^3 Fordacal 36, 50 kg/m^3 Fordacal 60 Pill #4: Not pumped 60 kg/m^3 Flowcarb 1000/ 60 kg/m^3 Flowcarb 500/ 60 kg/m^3 LC Lube/ 35 kg/m^3 Mica Fine/35 kg/m^3 Mica Medium/30 kg/m^3 Chek Loss Plus/30 kg/m^3 SoluFlake Fine/30 kg/m^3 SoluFlake Medium
HOLE CONDITION:	No fluids related problems experienced while drilling/tripping or running casing. Hole cleaning indicated a stable hole condition.
CASING RUNNING / CEMENTING:	The 9 5/8" casing was set with a total of 72m3 mud being lost whilst cementing the casing.
ADDITIONAL COMMENTS:	

H.6 8 ½" Section

SECTION SYNOPSIS:
The 8 ½" BHA was run and cement tagged at 3306m in the 9 5/8" casing. The shoetrack and plugs were drilled out to 3356 m whilst simultaneously lowering the mud weight from the 1.60 sg used in the previous section to 1.48sg. A further 3m of new formation were drilled and an FIT conducted to an EMW of 1.60 sg.

After this drilling continued at a restricted ROP of 15 m/hr. Twice samples were circulated to surface, but drilling continued uneventfully to a final T.D. of 4025m. One and a half times bottoms up were circulated to clean the hole and the drilling assembly pulled to surface.

Wireline logging commenced and lasted for approximately 6 days. No fill observed on any of the runs. Several tight spots were observed. Typical 1000-2500 lbs overpull needed. Got stuck twice and a 11 000 lbs overpull was needed to get free. Wireline tool shut down and had several tool failures during the coring run. Most likely due to high temperature in the well.

Properties/ Drilling Fluid Technical Performance
CARBOSEA OBM had been selected for this section and once again provided excellent hole cleaning, hole condition, lubrication, inhibition and low HTHP fluid loss.

At the end of cementing operations on the previous section the O/W ratio was 68/32 and weight 1.60 sg. In order to drop the weight to 1.48 sg and increase the O/W ration for drilling the 8 1/2" section a base oil rich premix was built and bleed to the active system whilst drilling out the shoetrack and plugs. This brought up the O/W ratio to 70/30 at the start of the section and was further increased whilst drilling to 72/28 by the further addition of base oil rich premix whilst drilling.

WPS was brought up to 145 kg/m^3 at the start of the section and maintained within a few kg/m3 of 150kg/m3 throughout, by the addition of CaCl2 powder to the active system as required. HTHP fluid loss was tight at the start of the section (1ml fluid loss) and remained so throughout the section without the need to add additional product apart from that incorporated in the premixes at system concentrations.

Electrical stability climbed rapidly from an initial 520 volts to between 600 and 1000 volts for the remainder of the section as the emulsifier in the base oil premix was incorporated.

Mud Rheology
Mud rheology was good throughout, Carbogel and Rheo-Clay being incorporated in the initial base oil premix used for lowering mud weight to ensure that rheology did not suffer with this dilution. As a result rheology remained strong throughout the section with excellent hole cleaning throughout. Towards T.D. a base oil premix without viscosifiers was bleed to the active system to ensure that rheology did not climb out of specification.

Lost Circulation Materials
No lost circulation materials were required in this section.

Solids Control
A combination of 200 and 230 mesh screens were run throughout the drilling of this section. Low gravity solids remained within specification and the shakers performed admirably with no issues.

3.6.1 Mud Properties/Drilling Fluid Technical Performance

Mud Property	Unit	Programmed	Minimum	Maximum	Typical
Density	sg	1.48	1.48	1.48	1.48
6 rpm reading	lbs/100ft^2	12-18	13	16	12
3 rpm reading	lbs/100ft^2	8 – 15	9	14	10
PV / YP	cP / lb/100 ft^2	ALAP / 15-25	34/19	37/28	24
Gel Strengths	lbs/100 ft^2	<12 / <20	12/22	14/22	13/20
HTHP Fluid Loss (500 psi)	ml/30 min	<3	1	1	1
Chlorides	Kg/m^3	+/- 150	157	142	147
LGS	%	<6	5.26	5.49	4.2
ES	mV	> 500	718	989	950
O/W ratio		75:25 – 80:20	70:30	73:27	72:28

Table: Important Drilling Fluid Properties

DRILLING FLUID TECHNICAL PERFORMANCE	
MUD DENSITY (sg):	1.48 SG
CONTAMINATION:	None.
INHIBITION:	Good, no issues. Good quality PDC shaped cuttings observed at shakers at all times.
SOLIDS CONTROL EQUIPMENT:	4 x Swaco Shale Shakers.
HOLE CLEANING:	Excellent throughout section.
LOST CIRCULATION INCIDENTS:(PILLS PUMPED & CONCENTRATIONS):	None.
HOLE CONDITION:	No fluids related problems experienced while drilling/tripping or during wireline operations. Hole cleaning indicated a stable hole condition.
CASING RUNNING / CEMENTING:	N/A
ADDITIONAL COMMENTS:	

H.7 P&A

SECTION SYNOPSIS:
The objective for the P & A operation, was to isolate the reservoir interval with two cement plugs, both plugs was set in two stages. #1a/b- from TD of the well at 4025 m to 3390 m, and another cement plug - #2a/b from 3390 m to 2850 m. Both plugs were successfully set with plug#1 tagged at 3390 m and plug#2 at 2845 m. Typically, +/- 80 m³ of severely cement/spacer contaminated mud were diverted to separate pit on each plug. The mud was treated as required with Carbomul HT emulsifier to counteract water and soap contamination from the cement spacer. Cement stinger was pulled out of hole and a simple dress of assembly was run in hole. Plug #2 was dressed off to 2846 m.

At 850 m the system was weighed up to 1.60 sg, leaving 1.48 sg below 850 m in well, and the 9 5/8" casing was cut at 806 m. Immediately after cutting, exposing well to 1.60 sg Carbo-Sea behind casing, an increasing gain in trip tank was observed. The well was flowchecked, still observing gain from well and pressure build up after closing in well. The pressure was circulated out with returns through choke over poor boy degasser, observing loss to formation that seemed to come back as gain at a later stage.

The 9 5/8" casing cutter assembly was pulled and a 9 5/8" casing spear assembly was run in hole, pulling 9 5/8" casing to surface. A 13 3/8" bridge plug was set at 775 m and pressure tested to 35 bar.

The well was then displaced to 1.30 sg Aquadrill, by pumping a 10 m³ hi-vis soap pill, followed by 135 m³ 1.30 sg Aquadrill and interface was diverted for onshore disposal. The Aquadrill system contained a 1-3% oil phase after displacement, meaning no discharges to sea and whole system to be backloaded for onshore disposal.
When retrieving 13 3/8" wear bushing and seal assembly, a pressure of 31 bar and 832 ltr gain was observed when opening choke. The pressure was bled down and circulated out through choke and poor boy degasser.

The 13 3/8" casing was cut at 751 m, pulled free and gas circulated out before pulling casing to surface.
A Parabow plug was run in hole and set at 775 m, before cement plug #3 was set at 749 m to 609 m. Prior to setting the plug, up to 17% gas was observed while circulating to condition mud. The excess spacer/cement interface was circulated out and diverted for onshore disposal.

The cement plug was tested and tagged high at 585 m in next run, before performing well clean out by pumping a 10 m³ hi-vis soap pill followed by seawater pumped with direct feed to mud pumps. Oil contaminated Aquadrill from well and interface in returns were backloaded for onshore disposal. Cement plug #4 was set at 585 m to 509 m and excess cement was circulated out above plug, discharging returns to sea.

A 30 m³ hivis soap pill was mixed (10 % Bakerclean 5, 6% Bakerclean 6) and circulated through surface eqiuipment, lines, pits etc in order to clean for residue OBM.

BOP /marine rise was then pulled and 20" and 30" casing cut and pulled. Finally, cement was tagged at 489 m before moving rig to new location.

DRILLING FLUID TECHNICAL PERFORMANCE	
MUD DENSITY (sg):	1.48 - 1.60 SG Carbo-Sea OBM 1.30 SG Aquadrill WBM
CONTAMINATION:	Aquadrill system contaminated with 1-3% oil from Carbo-Sea.
INHIBITION:	No issues.
SOLIDS CONTROL EQUIPMENT:	Coarse screens were used when changing between mud systems, typically 84 mesh screens.
HOLE CLEANING:	Observed a lot of cuttings in the Carbo-Sea mud in returns when displacing to Aquadrill.
LOST CIRCULATION INCIDENTS:(PILLS PUMPED & CONCENTRATIONS):	Volume gain and gas observed from well after cutting 9 5/8" casing. Also in combination with losses when it was circulated.
HOLE CONDITION:	No issues.
CASING RUNNING / CEMENTING:	Cement plugs # 1a, 1b, 2a, 2b plugged the open hole into 9 5/8" casing from 4025 m to 2850 m. Cement plug # 3 and 4 was set in 13 3/8" – 20" casing from 749 m to 509 m.
ADDITIONAL COMMENTS:	