



HYDRO

**HYDRO OIL & ENERGY
FINAL WELL REPORT
WELL 30/11-6 S**

30/11-6 S, Brontes

Licence PL-272

Drilling permit L-1063

Abandonment Date 02.07.2003

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WELL SUMMARY

The exploration well 30/11-6 S is located in the northwestern part of block 30/11 and was placed to test the Brontes prospect. Hydro Oil and Energy on behalf of PL272 drilled the well. It was spudded 1 June 2004 and plugged and abandoned 2 July 2004.

All depths in this report are referenced to RKB unless otherwise stated.

Objectives

The primary objective for well 30/11-6S was to prove commercial hydrocarbon resources and to establish the production potential in sandstones within the Upper and Middle Tarbert Formations within the Brent Group.

The secondary objectives were to investigate commercial resources and reservoir quality for the remaining part of the Brent Group including Lower Heather) Formation. It was also important to secure seismic tie by shooting VSP as well as to obtain pressure measurements for regional understanding and for evaluation of internal pressure barriers within the Brent Group.

Licence owners

Production License 272 was awarded by Royal Decree, the 15th of March 2002 with Norsk Hydro ASA as the operator.

The license percentage share of PL-272 is as follows:

Hydro Oil & Energy	50 %
Svenska Petroleum Exploration	25 %
DNO	25 %

Results

The well was spudded the 01st of June 2004 and reached a total depth of 3550 m MD RKB in the Drake Formation the 24th of June 2004.

The well penetrated Lower Heather (Tarbert 4), Upper Tarbert (Tarbert 3), Middle Tarbert (Tarbert 2), Lower Tarbert (Tarbert 1) and Ness Formations of the Brent Group. The main reservoir targets were Upper and Middle Tarbert. The main drilling objective was not met as no commercial discovery was made. Only residual hydrocarbons were found in the Middle and Upper Tarbert Formations.

The wire-line program was performed according to dry hole scenario. The MDT sampling, MSCT and the FMI wire-line logs in the 8 ½" section, which would otherwise have been included, were taken out of the program.

The well did not prove any commercial hydrocarbons, although good oil shows were obtained in Upper and Middle Tarbert Formation. The formation tops were encountered somewhat deeper than the prognosis. The reservoir quality was slightly better than expected.

Three conventional cores were cut, covering parts of Upper Tarbert, Middle Tarbert and parts of Lower Tarbert Formation of the Brent Group. The cores showed variable reservoir quality,



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but contained several reservoir units with good reservoir quality. The best reservoir zone was found within the upper parts of Middle Tarbert.

The well was permanently plugged and abandoned as a dry well on the 02nd of July 2004.

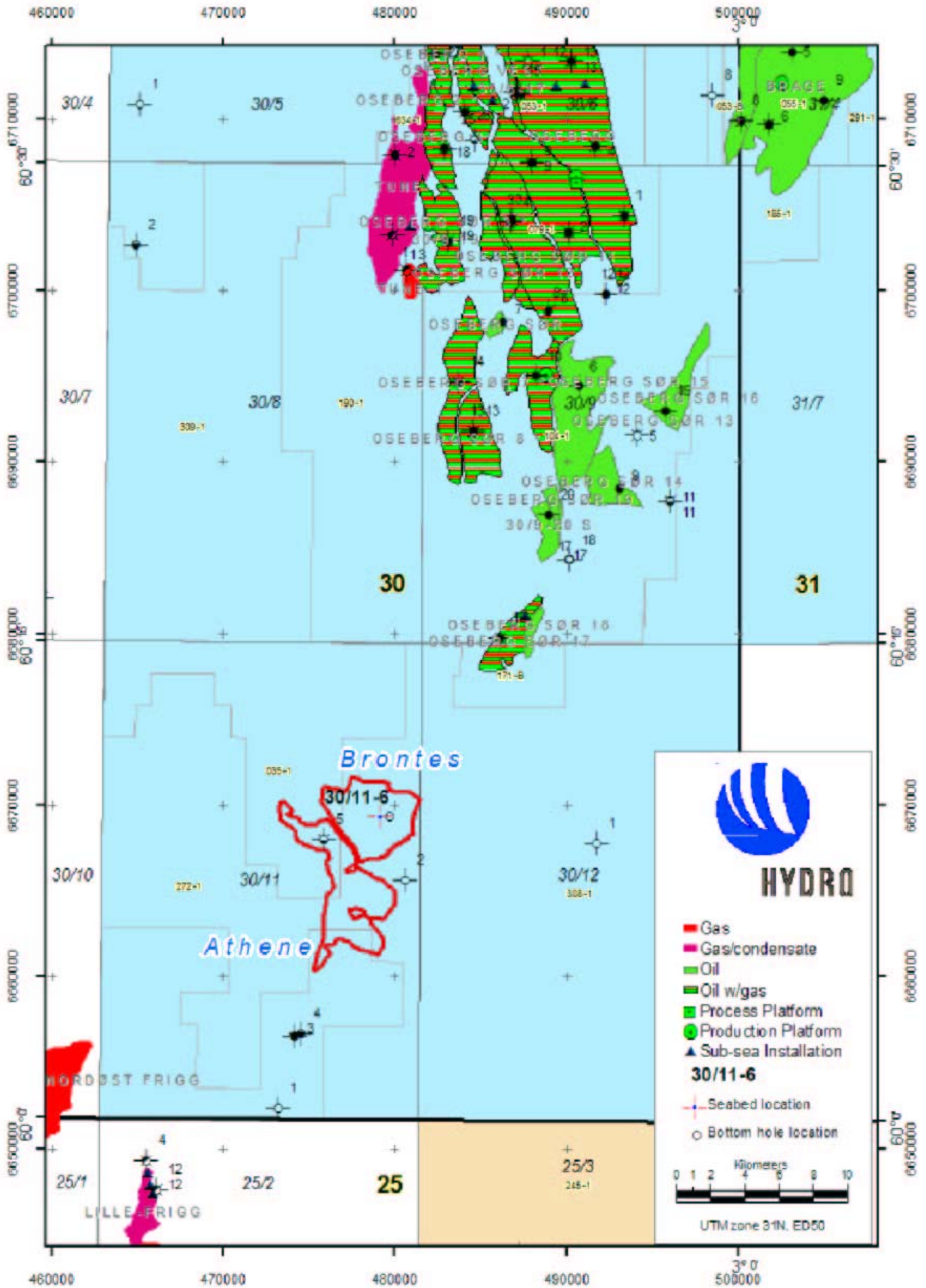


Summary of Well Data

LOCATION:	Geo: 60°09'32,53" N 02°37'29,92" E UTM: 6 669 338,40 mN 479 181,60 mE ED 50, UTM Zone31, SM 03°E
OPERATOR:	Norsk Hydro ASA
RIG:	Deepsea Delta
CONTRACTOR:	Odfjell Drilling
KB ELEVATION (to MSL):	29m
WATER DEPTH (MSL):	103,5m
START OF OPERATION:	30.05.2004
WELL SPUDDED:	01.06.2004
REACHED TD:	24.06.2004
OFF LOCATION:	02.07.2004
STATUS:	P&A
FORMATION AT TD:	Drake Formation
Drilling depths (MD):	36" 132,5 m to 229,0 m 17 1/2" 229,0 m to 1415,0 m 12 1/4" 1415,0 m to 2700,0 m 8 1/2" 2700,0 m to 3550,0 m
Casing / Liner depths:	30" 132,5m to 229,0 m 13 3/8" 132,5m to 1408,0 m 9 5/8" 132,5m to 2695,0 m

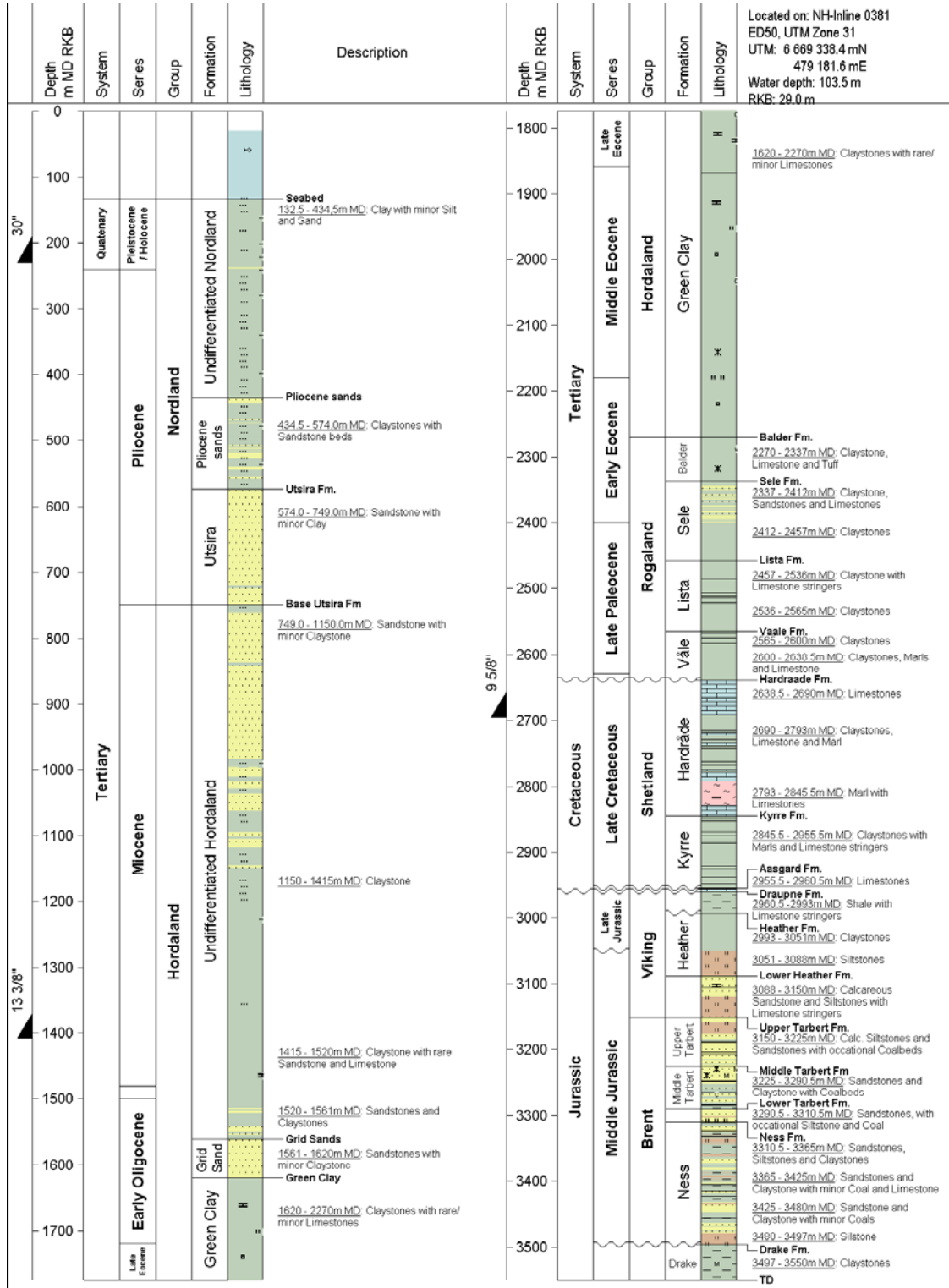


Location map.





Geological summary.



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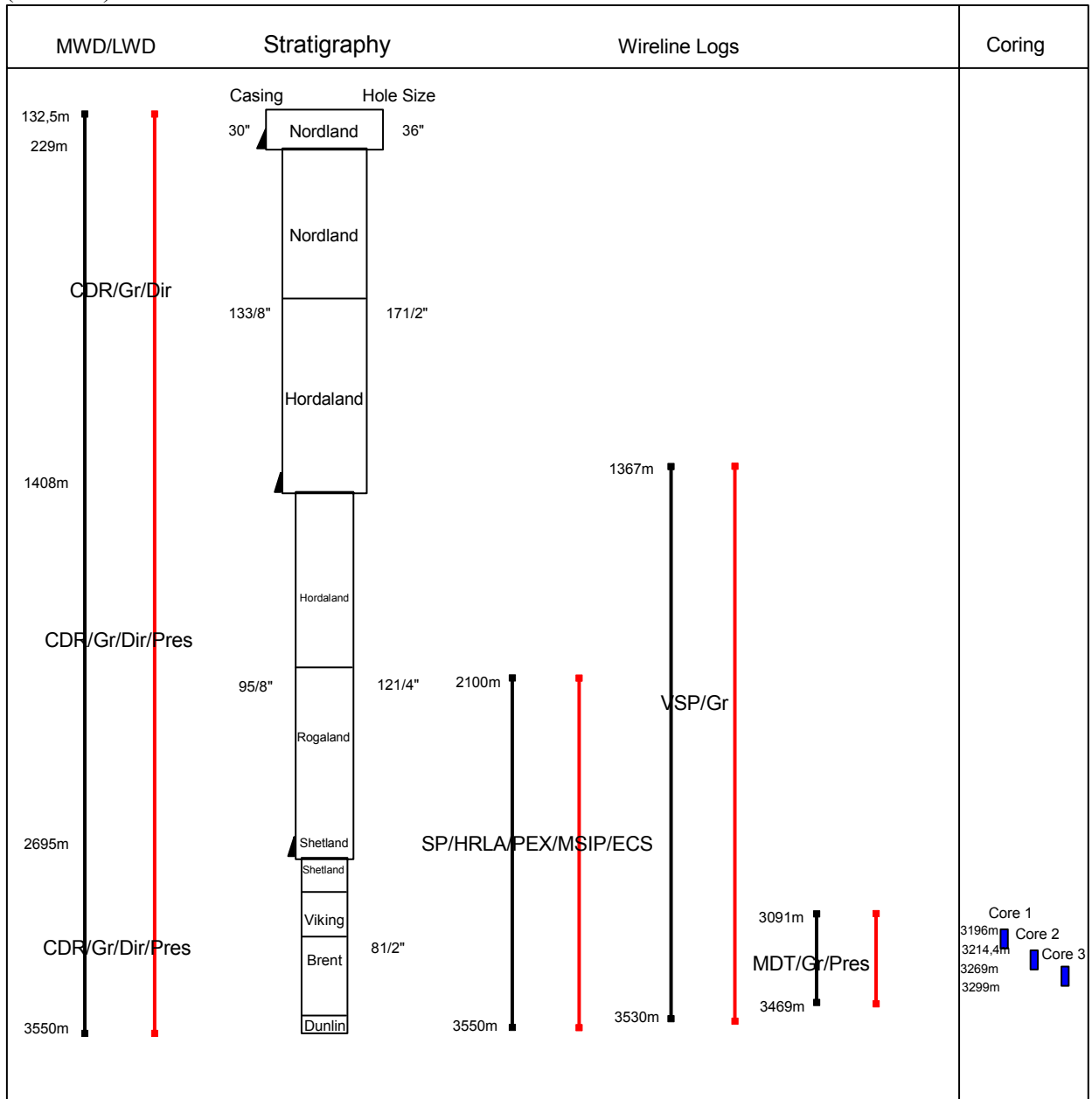


SECTION A: GEOLOGY, GEOPHYSICS AND PETROPHYSICS.

1 DATA ACQUISITION

1.1 Data acquisition overview figure.

The figure below presents the initial data acquisition program (in red) vs. the real acquisition (in black).





1.2 Hydrocarbon shows description table.

INTERVAL (mRKB)	SOURCE	LITHOLOGY	SHOWS DESCRIPTION
3177-3196	Cuttings	Sandstone	no HC od, no O stn, slow v wk bl wh blmg Fluor cut, no vis cut, mod bl wh ring Fluor res, no vis res
3196 - 3200	Core	Sandstone	fr pet Od, fr spty lt brn oil Stn, pr spty fnt or dir Fluor, mod strmg mod bl wh Fluor Cut, no vis Cut, pr - fr mod bl wh blmg and disc points Fluor Res, no vis Res.
3201 – 2004	Core	Sandstone	Mod pet Od, fr uni lt brn oil Stn, fr uni dull or dir Fluor, slo strmg dull bl wh Fluor Cut, no vis Cut, fr brgt crm blmg and disc points Fluor Res, no vis Res
3206 – 3212	Core	Sandstone	pr pet Od, tr spty lt brn oil Stn, pr spty dull or dir Fluor, slo strmg dull bl wh Fluor Cut, no vis Cut, pr dull crm ring Fluor Res, no vis Res
3212 – 3214.4	Core	Sandstone	mod pet Od, fr uni lt brn oil Stn, tr spty dull yel dir Fluor, slo strmg dull bl wh Fluor Cut, no vis Cut, pr dull crm ring Fluor Res, no vis Res
3216 – 3220	Core	Sandstone	fr pet od, fr spty lt brn oil stn, pr spty dull yel dir fluor, mod strmg bl wh fluor cut, no vis cut, fr dull yel disc points bl wh fluor res, no vis res
3221	Core	Sandstone	dk gry - grysh blk, r sdy, sli slty, hd, v Mic, sil cmt, Tr carb mat,
3222 – 3226	Core	Sandstone	fr pet od, fr spty lt brn oil stn, pr spty dull yel dir fluor, mod strmg bl wh fluor cut, no vis cut, fr dull yel disc points bl wh fluor res, no vis res
3227 – 3246	Core	Sandstone	fr pet od, no - tr spty lt brn oil stn, fr spty dull or dir fluor, slo - mod blmg bl wh fluor cut, no vis cut, tr -fr dull crm disc pts fluor res, no vis res
3250 – 3252	Core	Sandstone	fr pet od, gd uni brn oil stn, pr spty dull or dir fluor, mod strmg bl wh fluor cut, no vis cut, fr mod bl wh blmg fluor res, no vis res
3252-3259	Core	Sandstone	wk pet od, pr spty lt brn oil stn, no dir fluor, mod blmg dull bl wh fluor cut, no vis cut, fr mod crm blmg - spty fluor res, no vis res
3268 – 3269	Core	Sandstone	fr pet od, fr uni lt brn oil stn, gd uni brt yel dir fluor, inst even brt bl wh fluor cut, no vis cut, gd brt crm – bl wh blmg fluor res, no vis res
3269 – 3272	Core	Sandstone	fr pet od, fr uni lt brn oil stn, pr spty dull or dir fluor, slo blmg dull bl wh fluor cut, no vis cut, fr mod crm – bl wh spty fluor res, no vis res
3276 – 3281	Core	Sandstone	no pet od, tr spty lt brn oil stn, pr spty dull crm dir fluor, slo blmg dull bl wh fluor cut, no vis cut, fr mod crm blmg fluor res, no vis res
3284-3285	Core	Sandstone	no pet od, tr spty lt brn oil stn, pr spty dull crm dir fluor, slo blmg dull bl wh fluor cut, no vis cut, fr mod crm blmg fluor res, no vis res
3293 – 3299	Core	Sandstone	wk pet od, tr spty lt brn oil stn, pr spty dull or dir fluor, v slo blmg dull bl wh fluor cut, no vis cut, fr mod bl wh disc pts - blmg fluor res, no vis res



1.3 Logging table. MWD / LWD / Wireline.

Run	Log type	Interval logged	Comments:
1	MWD: DIR	132.5 - 229 m	36"
2	MWD: GR-RES-DIR	210 - 1415 m	17 ½"
3	MWD: GR-RES-DIR	1367 - 2413 m	12 ¼"
4	MWD: GR-RES-DIR-PRES	2289 - 2434 m	12 ¼"
5	MWD: GR-RES-DIR-PRES	2434 - 2690 m	12 ¼"
6	MWD: GR-RES-DIR-PRES	2694 - 3196 m	8 ½"
7	MWD: GR-RES-DIR-PRES	3196 - 3550 m	8 ½"
1A	Wireline: SP-HRLA-PEX-MSI-ECS	2100 - 3550 m	8 ½"
1A	Wireline: MDT-GR	3091 - 3469m	8 ½"
1A	Wireline: VSP-GR	1367 - 3530 m	8 ½"

1.4 Sidewall coring table.

No sidewall cores were collected for this well

1.5 Conventional Coring table.

Core no.	Top [m MD RKB]	Bottom [m MD RKB]	Recovery (%)	Depth shift (m)*	Formations
1	3196,0	3214,4	100,0	-0,6	Upper Tarbert
2	3214,4	3269,0	100,0	-0,6	Upper and Middle Tarbert
3	3269,0	3299,0	96,8	-0,6	Middle and Lower Tarbert

*Average dynamically depth shift applied to each core, there is no overlap in depth between the cores.



2 GEOLOGICAL AND GEOPHYSICAL EVALUATION

2.1 Geological and Geophysical results

2.1.1 Results

Prognosed and actual time/depth values in well 30/11-6 S are listed in Table 2.1-1. Prognosed and actual depth and thickness numbers for the reservoir section are listed in [Table 2.1-2 Prognosis vs. results; Reservoir section](#). A Tarbert zonation scheme comparable to the scheme used further north in the Oseberg South Area has been used in this document. The table uses this nomenclature with names used in the prognosis in brackets. Figure 2.4-1 shows wire line logs over the reservoir section with both zonation schemes.

VSP

A *Vertical Incidence Vertical Seismic Profile* (VIVSP, Ref. 1) was recorded and processed by Schlumberger. It was recorded from 3530m to 2713.5m MD in 8.5-inch open hole section and from 2698.4m to 1367.8m MD in 9.5/8-inch cased hole section. VSP stations were recorded at 15.12m MD intervals using a four level Versatile Seismic Imager (VSI) tool.

A tuned array of 3 x 155 cu. inch Bolt 1900 LLX airguns were used as a source positioned above the centre of the down hole tool-array. At least five good repeatable shots were acquired at each level. The data quality throughout the survey was considered to be good.

A composite display consisting of the corridor stack and the VSP up going wave field spliced into surface seismic (SH9004) is shown in **Figure 2.4-2**. An increase in impedance is displayed as a blue trough. A 14 ms shift was applied to the surface seismic, and a very good tie between the VSP and the synthetic seismogram was obtained. The resolution of the VSP is better than the original seismic.

Synthetic Seismogram

Check shot calibrated velocity logs and density logs from the well have been applied to generate synthetic seismograms. A zero phase version of a synthetic seismogram as well as sonic and GR logs are displayed together with the VSP in **Figure 2.4-3**.

Base Cretaceous Unconformity came in 12,2m deeper than prognosed. The seismic interpretation of Base Cretaceous Unconformity is in maximum peak reflecting a decrease in acoustic impedance below the Cromer Knoll Gp., which is only 5 m in the well. The seismic pick is 11.1 ms TWT too shallow according to the check shot calibrated logs, however only – 2.9 ms TWT when the 14 ms TWT shift is included.

Top Lower Heather (Tarbert 4b) is observed 45,7m deeper than prognosed indicating a substantial uncertainty of the seismic pick and what it actually represents. The prognosed horizon follows a strong peak that correlates to an intra Heather event in the 30/11-6S well. (**Figure 2.4-3**) This is a possible regional event that may be correlated to other wells in the area. The actual top Upper Tarbert in the 30/11-6S well is found at a weak increase in the velocity corresponding to approximately onset peak in the synthetic seismogram. The actual Upper Tarbert may be difficult to follow on real seismic (**Figure 2.4-4**).

Top Ness was found 12,2m and top Dunlin 8,7m deeper than prognosis. The sonic data shows no major change at these tops. The difference between actual and prognosed time is 31,1 and



27,2 ms TWT, respectively. A time shift of the seismic reduces the difference to 17.1 and 13.2 ms TWT, respectively.

2.1.2 Discussion

The depths were encountered within the given uncertainties. A relatively high deviation from prognosed depth for the Top and Base Green Clay was expected, because the clay is not associated with any continuous seismic event. The Base Cretaceous Unconformity, top Lower Heather (Tarbert 4b) and the deeper horizons came in deeper than prognosed, partly caused by uncertain pick in seismic interpretation. A seismic section along the well path with pre-drill interpretation is shown in **Figure 2.4-4**.

The difference between actual and prognosed depths indicates a wrong pick at top Lower Heather Fm (Tarbert 4b) in the vicinity of the well 30/11-6S. A thorough examination of the well results and correlation to nearby wells will be performed before maps are updated. The top reservoir map (top Upper Tarbert / Tarbert 3) shown **Figure 2.4-5** is the pre-well depth map. **Figure 2.4-6** shows a seismic line from the 30/11-5 well to the 30/11-6S well.

The total reservoir section was somewhat thinner than expected. Lower Heather Fm was 12 m thinner. The Tarbert Fm was 20.5 m thinner in total. However there were large discrepancies with respect to the internal thickness distributions. Upper Tarbert Fm is 44 m thicker than expected, whereas Middle Tarbert is 76.5m thinner. The large difference between the prognosis and result is partly explained by the much deeper top Middle Tarbert Fm. The boundary between Upper and Middle Tarbert Fm is defined by the transition from tidally influenced deposits to shore face deposits. This transition from tidal to shoreface environment is clearly detectable on the core, but is not that obvious by the use of log correlation only. Lower Tarbert Fm is 20 m thick but was left out from the prognosis. The reservoir subdivision is shown in **Table 2.1-1** and in **Figure 2.4-1**.

The lower part of the cored interval (Lower Tarbert) consists of well-laminated sandstones interpreted to represent a wave-dominated shoreline environment deposited above the transgressed delta plain of the underlying Ness Formation. Deposits from swamps and wave-agitated embayments characterize the lower part of Middle Tarbert Formation, while a tide-influenced channel/estuarine channel complex deposits characterize the upper part of Middle Tarbert. These deposits are overlain by outer embayment deposits, which are capped by an erosional ravinement surface. This surface separates the overlying shoreface deposits, which are assigned to the Upper Tarbert Formation. The transition between Middle and Upper Tarbert is interpreted as a transgressive event, with the establishment of a high-energy shore face lying above the protected environments of the Middle Tarbert. More detailed descriptions of the cored interval are found in the Sedimentological Report (ref. 2).

The reservoir properties (see **Table 2.1-2**) were slightly better than the prognosis. However it is difficult to compare the prognosis and the result due to both a change in the reservoir boundary between Upper and Lower Tarbert Fm compared to the prognosis and because the prognosis only included the best parts of Upper Tarbert Fm when calculating the reservoir properties. The best reservoir unit is encountered in the upper part of Middle Tarbert Fm. This unit has porosities around 20% and permeability in the range 1 to 4 Darcy.

The formation pressure plot is shown in **Figure 3.7-2**. The best reservoir unit in upper part of Middle Tarbert Fm shows overpressures around 11 bars compared to normal pressure (using a normal pore pressure gradient of 1,03 g /cc). This was 26 bar lower compared to the same reservoir unit in the 30/11-5 well.



References:

Ref. 1. Brontes 30/11-6S VSP Processing. Schlumberger, 2004.

Ref. 2 Brontes 30/11-6 S Core description. NH 2004



Group	Formation tops prognosis	Actual depth, m TVD MSL	Prognosed depth, m TVD MSL	Difference, m	Actual time, ms TWT	Prognosed time, ms TWT	Difference ms TWT
Nordland	Seabed	103.5	103.5	0		140	
	Pliocene sand	405.5	398	7.5		452	
	Utsira	545	526	19		580	
Hordaland	Hordaland	720	713	7		760	
	Green clay	1550.3	1575/1675	-24.7		1629	
Rogaland	Balder	2147.2	2135	12.2	2054.8	2049	5.8
	Sele	2209.7	2196	13.7	2099.6	2100	-0.4
Shetland	Hardråde	2499.7	2517	-17.3	2317.1	2306	11.1
	Kyrre	2702.5	2691	11.5	2430.0	2419	11.0
Cromer Knoll	Åsgard	2812.2	2785	27.2	2500.7	Not interpreted	
Viking	BCU/Draupne	2817.2	2805	12.2	2504.1	2493	11.1
Brent	Lower Heather (Tarbert 4)	2944.7	2899	45.7	2595.8	2560	35.8
	Upper Tarbert (Tarbert 3)	3006.7	2974	32.7	2629.6	Not interpreted	
	Ness	3167.2	3155	12.2	2722.1	2691	31.1
Dunlin	Drake	3353.7	3345	8.7	2826.2	2799	27.2

Table 2.1-1 Geophysical Summary



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Group	Formation	MD RKB	TVD MSL	TVD MSL Prognosis	Thickness	Thickness Prognosis	Thickness Difference
VIKING	Lower Heather	3088.0	2944.7	2899	62	75	-12
BRENT	Upper Tarbert	3150.0	3006.7	2974	75	39	36
	Middle Tarbert	3225.0	3081.7	3013	65	143	-68
	Lower Tarbert	3290.0	3146.7	3155	21	0	20
	Ness	3310.5	3167.2	3155	187	190	-3
DUNLIN	Drake	3497.0	3353.7	3345	53	-	-

Table 2.1-2 Prognosis vs. results; Reservoir section.

2.2 Litostratigraphy

2.2.1 Lithostratigraphic Summary

This summary is compiled predominantly from ditch cuttings and core descriptions.

Wire-line and MWD logs were used to aid lithological interpretation and the placement of formation boundaries.

The well was drilled with returns to seabed from the sea floor at 132,5 m to 1415 m before setting the 13 3/8" casing at 1408 m. For details on sampling descriptions see attached Composite log and chapter 2.3 Lithological descriptions.

Nordland Group (132,5 – 749 m MD)

- Undifferentiated (132,5 – 434,5m) – Clay with minor Silt and Sand.
- Pliocene Sand (434,5 – 574m) – Claystone with sandstone beds.
- Utsira Formation (574 – 749m) – Sandstone with minor Clay.

Hordaland Group (749 – 2270 m MD)

- Skade Sandstone (749 – 1150m) - Sandstone interbedded with Claystone
- Undifferentiated (1150 – 1561m) - Claystone with rare Sandstone and Limestone
- Grid sands (1561 - 1620m) - Sandstone with minor Claystone
- Green Clay (1620 - 2270m) - Claystone with minor Limestone

Rogaland Group (2270 – 2638,5 m MD)

- Balder Formation(2270 - 2337m) - Claystones, Limestones and Tuff
- Sele Formation (2337 - 2457m) - Claystones, Sandstones and Limestones
- Lista formation (2457 - 2565m) - Claystones with Limestone stringers
- Våle Formation (2565 - 2638,5m)- Claystones, Marl and Limestone

Shetland Group (2638,5 – 2955,5 m MD)

- Hardråde Fm (2638,5 – 2845,5m)- Marl and Limestone
- Kyrre Formation (2845,5 – 2955,5m)- Claystone with Marl and Limestone stringers

Cromer knoll Group (2955,5 – 2960,5 m MD)

- Åsgard formation (2955,5 - 2960,5m)- Limestone

Viking Group (2960,5 – 3150 m MD)

- Draupne Fm (2960,5 - 2993m)- Hot shale with Limestone stringers
- Heather Fm (2993 - 3150m) - Calcareous Sandstone with Siltstone and Limestone stringers

Brent Group (3150 - 3497 m MD)

- Tarbert Formation (3150 - 3310,5m)- Sandstone with Siltstone and Claystone with minor Coal
- Ness Formation (3310,5 - 3497m)- Sandstone, Siltstone and Claystone with Coal

Dunlin Group (3497 – 3550 m MD)

- Drake Formation (3497 - 3550m) - Claystone



2.2.2 Lithological description

2.2.2.1 Nordland Group

132,5 - 749,0 m MD (132,5 – 749,0 m TVD)

Returns to seabed. Interpretation based on MWD logs.

132,5 – 434,5 m MD: Clay with minor Silts and Sands

Pliocene Sands: 434,5 - 574,0 m MD (434,5 – 574 m TVD)

434,5 – 574 m MD: Claystones with Sandstone beds

Utsira Fm.: 574,0 - 749,0 m MD (574 – 749 m TVD)

574 – 749 m MD: Sandstones with minor Clays

2.2.2.2 Hordaland Group

749,0 - 2270,0 m MD (749 – 2176,2 m TVD)

Returns to seabed. Interpretation based on MWD logs

Skade Sand: 749 – 1150 m MD (749 – 1146,8 m TVD)

749 – 1150 m MD: Sandstone with minor Claystone.

Undifferentiated: 1150 – 1561 m MD (1146,8 – 1525,6 m TVD)

1150 – 1415 m MD: Claystone

1415 – 1520 m MD: Claystone with rare Sandstones and Limestones

Clst: md gry-lt gry, brnsh gry, gnsh gry-lt gnsh gry, sft-frm, sbblky-blky, non-sli calc, slty, micropyr

Sst: gnsh gry-pl olv gry, clr-trnsl & mky wh lse Qtz Gr, v f-crs, ang-rnnd, pr-mod srt, fri, glauc, kao cmt

Ls: wh-yelsh gry, r pksh hue, sft-frm, glauc, sli sdy, microxln

1520 – 1530 m MD: Sandstones and Claystones

Sst: gnsh gry - pl olv, clr trnsl - mlky Qtz, vf - f, ang - sbang, mod srt, fri, glauc, kao, Tr vf carb frag, non calc

Clst: m lt gry - lt gry, bcm brnsh gry, sft - frm, pred sli calc, slty, sli sdy, micropyr, Tr vf carb frag

1530 – 1561 m MD: Claystones

Clst: m lt gry - lt gry, bcm brnsh gry, sft - frm, pred sli calc, slty, sli sdy, micropyr, Tr vf carb frag



Grid Sands: 1561,0 - 1620,0 m MD (1525,6 – 1579,3 m TVD)

1561 - 1620 m MD: Sandstones with minor Claystones

Sst: lt gnsh gry - v lt gry, clr trnsl - mlky Qtz, vf - crs, sbrnrd - rndd, pr srt, fri, Glauca, kao, Tr vf carb frag, sli calc

Clst: m lt gry - lt gry, bcm brnsh gry, sft - frm, pred sli calc, slty, sli sdy, micropyr, Tr vf carb frag

Clst: brn gry - m dk gry, frm, sbblky - blk, non - sli calc, slty, Tr vf carb frag

Green Clay: 1620,0 - 2270,0 m MD (1579,3 - 2176,2 m TVD)

1620 - 1660 m MD: Claystones

Clst: brnsh gry - med gry, sft - frm, sbblky, pred non calc, slty, Tr micropyr, Tr sdy

1660 - 1944 m MD: Claystones with minor Limestones

Clst gn gry, med gry - olv gry, frm, blk - sbblky, sli calc - non calc, I.P. sli slty, Tr micropyr, r carb mat

1944 - 1990 m MD: Claystones and Limestones

Clst: gn gry, med gry - olv gry, frm, blk - sbblky, sli calc - non calc, I.P. sli slty, Tr micropyr, r carb mat

Clst: gry blk, blk, frm, sli slty, r micropyr, r Carb Mat, non calc

Ls: yel gry, blk, sft, occ slty, microxln

1990 - 2100 m MD: Claystones

Clst: gn gry-dk gn gry, r m gry, sft-frm, sbblky-blk, non calc, I.P. sli slty, r micropyr, r carb mat

2100 - 2240 m MD: Claystones and rare Limestones

Clst: gn gry-dk gn gry, frm, sbblky-blk, non calc, I.P. slily slty, , r micropyr, r Carb Mat, occ glauc

Ls: lt brn gry-pl yel brn, sft, sbblky, I.P. arg, occ slily slty, r carb mat

2240 - 2270 m MD: Claystones

Clst: gn gry-dk gn gry, frm, sbblky-blk, non calc, I.P. slily slty, , r micropyr, r Carb Mat, occ glauc

Clst: lt brn-brn, sft-frm, sbblky, non calc

2.2.2.3 Rogaland Group

2270,0 - 2638,5 m MD (2176,2 – 2528,7 m TVD)

Balder Fm.: 2270,0 - 2337,0 m MD (2176,2 – 2238,7 m TVD)

2270 - 2337 m MD: Claystones, Limestones and Tuff

Clst: gn gry-dk gn gry, m dk gry - dk gry, frm, sbblky-blk, non - occ calc, I.P. slily slty, r micropyr, r Carb Mat, occ glauc

Clst: lt brn-brn, sft-frm, sbblky, pred-v calc

Ls: wh-yel gry, sft-frm, sbblky, r v f Carb Mat, microxln

Tf: m lt gry - m gry, sbblky, sft, sli calc, r blk spec, r micropyr



Sele Fm.: 2337,0 - 2457,0 m MD (2238,7 - 2352,4 m TVD)

2337 - 2412 m MD: Claystones, Sandstones and Limestones

Clst: olv blk - olv gry, m dk gry - dk gry, blk, frm, non calc, r slty, r sdy, r micropyr, r pyr nod

Sst: clr trnsl Qtz - mlky Qtz, f-m, r crs, sbang - sbrnnd, sli - non calc cmt, sli K cmt, r pyr nod

Ls: wh-yel gry, sft-frm, sbblk, r v f Carb Mat, microxln

2412 - 2457 m MD: Claystones

Clst: olv gry, m dk gry - dk gry, frm, stky, sbblk-blk, calc - v calc, I.P slily slty, r micropyr, r Carb Mat

Lista Fm.: 2457,0 - 2565,0 m MD (2352,4 - 2457,1 m TVD)

2457 - 2536 m MD: Claystones with Limestone stringers

Clst: olv gry - m gry, blk, sft - frm, sli stky, occ slty grad sltst, Tr micropyr, non - sli calc, r carb mat

Clst: mod - dk rd brn, pl rd brn, blk, frm, sli calc

Clst: gnsh gry - lt bLs:h gry, blk, frm, non calc

Ls: wh - v lt gry, sft, occ sdy, microxln

2536 - 2565 m MD: Claystones

Clst: tolv gry - olv blk, dk gry, blk, frm, sli slty, r - sli calc, r blk spec, non - r micropyr

Våle Fm.: 2565,0 - 2638,5 m MD (2457,1 - 2528,7 m TVD)

2565 - 2600 m MD: Claystones

Clst: olv gry - olv blk, dk gry, blk, frm, sli slty, r - sli calc, r blk spec, non - r micropyr

2600 - 2638,5 m MD: Claystones, Marls and Limestone

Clst: olv gry - m gry, blk, frm, occ sli slty, sli - v calc, pred sli calc, r micropyr

Mrl: gnsh gry - m bLs:h gry, sft - frm, blk, r slty

Ls: lt gry - lt olv gry, sft - frm, blk, occ slty - vf sdy, pred sli arg
n

2.2.2.4 Shetland Group

2638,5 - 2955,5 m MD (2528,7 - 2841,2 m TVD)

Hardråde Fm.: 2638,5 - 2845,5 m MD (2528,7 - 2731,5 m TVD)

2638,5 - 2690 m MD: Limestones

Ls: wh - v lt gry, frm, blk, brit, microxln

2690 - 2700 m MD: Marly Claystones

Clst: m dk gry - olv gry, frm, blk, sli slty grad arg sltst, r vf carb frag, calc grad arg mrl, Tr micropyr

2710 - 2780 m MD: Limestones and Marls

Ls: wh - v lt gry, frm, blk, brit, microxln

Mrl: m gnsh gry - m bLs:h gry, frm, blk, sli slty grad arg sltst, r vf carb frag, micropyr



2780 - 2793 m MD: Limestones

Ls: wh - v lt gry, frm, blk, brit, microxln

2793 - 2830 m MD: Marls and Limestones

Mrl: gnsh gry - m bLs:h gry, sft - frm, blk, r slty, r blk spec, sli arg

Ls: wh - v lt gry, frm, blk, brit, microxln

2830 - 2845,5 m MD: Limestones

Ls: wh - v lt gry, frm, blk, brit, microxln, r Glauc

Kyrre Fm.: 2845,5 - 2955,5 m MD (2731,5 - 2841,2 m TVD)

2845,5 - 2955,5 m MD: Claystones with Marls and Limestone stringers

Clst: med lt gry-med gry-olv gry, gn gry, blk, frm, slily stky, v calc grad Mrl, r micropyr, Tr v f Carb Frag

Mrl: pl brn-mod brn, blk, frm, calc grad arg Ls:, r slty

Ls: wh-v lt gry, frm, blk, r arg, Tr Glauc, microxln

2.2.2.5 Cromer Knoll Group

2955,5 - 2960,5 m MD (2841,2 - 2846,2 m TVD)

Rødby Fm.: 2955,5 - 2960,5 m MD (2841,2 - 2846,2 m TVD)

2955,5 - 2960,5 m MD: Limestones

Ls: pred wh, occ yel gry-lt olv gry, blk, sft-frm, occ arg, r v f Carb Frag, r Glauc Nod, pred microxln

2.2.2.6 Viking Group

2960,5 - 3150,0 m MD (2846,2 - 3035,7 m TVD)

Draupne Fm.: 2960,5 - 2993,0 m MD (2846,2 - 2878,7 m TVD)

2960,5 - 2993 m MD: Shale with Limestone stringers

Sh: dk gry-gry blk, blk, frm, pred non calc, occ sli calc, v carb

Ls: pred wh, occ yel gry-lt olv gry, blk, sft-frm, occ arg, r v f Carb Frag, r Glauc Nod, pred microxln

Heather Fm.: 2993,0 - 3088,0 m MD (2878,7 - 2973,7 m TVD)

2993 - 3051 m MD: Claystones

Clst: olv gry - olv blk, dk gry, blk, pred non calc, sli slty, r carb mat, micropyr, r Ls:.

3051 - 3088 m MD: Siltstones

Sltst: olv gry - olv blk, frm, blk, non calc, v arg, r carb mat, micropyr, r glauc, r Ls:



Lower Heather Fm. 3088,0 - 3150,0 m MD (2973,7 - 3035,7 m TVD)

3088 - 3120 m MD: Calcareous Sandstones with Siltstone and Limestone stringers

Sst: wh - v lt gry, vf - f, blk, sbblk, sbrndd - rndd, r calc cmt, Kao cmt, r carb mat, r pyr, no vis por

Sltst: olv gry - olv blk, frm, blk, non calc, v arg, r carb mat, micropyr, r calc

Ls: wh-lt gry, blk, frm, microxln

3120 - 3150 m MD: Siltstones

Sltst: lt olv gry-m dk gry, brnsh gry, sbblk, r sdy, sli arg, v calc cmt, r Carb mat, r pyr

2.2.2.7 Brent Group

3150,0 - 3497,0 m MD (3035,7 - 3382,7 m TVD)

Upper Tarbert Fm.: 3150,0 – 3225,0 m MD (3035,7 – 3110,7 m TVD)

3150 - 3161 m MD: Calcareous Sandstones and Siltstones

Sst: wh-v lt gry, med gry, blk, v f-f, sbrndd-rndd, v calc cmt, r pyr, r carb mat, sli slty, no vis por

Sltst: dk gry-m dk gry, olv gry, sbblk, v calc cmt, v arg, sli sdy-sdy grad Sst., r micromic, r pyr, r Carb mat

3161 – 3177,5 m MD: Calcareous Siltstones and Sandstones

Sltst: dk gry-m dk gry, olv gry, sbblk, v calc cmt, v arg, sli sdy-sdy grad Sst., r micromic, r pyr, r Carb mat

Sst: wh-v lt gry, med gry, blk, v f-f, sbrndd-rndd, v calc cmt, r pyr, r carb mat, sli slty, no vis por

3177,5 – 3203,5 m MD: Calcareous Sandstones interbedded with Siltstones, Coal and Limestones

Sst: lt gry-med gry-lt brn gry, clr trnsl Qtz, pred v f-f, occ med-crs, Tr v crs, sbrndd-rndd, mod srt, pred non calc, r sli calc, arg mtx, Tr Micropyr, Tr Carb mat, pred slty, Tr Micromic, Coal Frag

Sltst: brn gry-med dk gry, blk, frm, v carb, micropyr

C: blk, brit, blk, frm, micropyr

Ls: wh-v lt gry, blk, frm, occ sli arg, microxln

3203,5 – 3225,0 m MD: Sandstones with minor Coal beds

Sst: m lt gry - lt brnsh gry-brn blk, clr trnsl - mlky Qtz, vf - m, r crs, sbang - sbrndd, wl srt, sli-v calc cmt, r-Tr mic, Tr carb mat, pr-mod vis por.

C: blk, bti, blk, hd, micropyr

Middle Tarbert Fm.: 3225,0 – 3290,5 m MD (3110,7 – 3175,2 m TVD)

3225 – 3246 m MD: Sandstones with minor Claystone beds

Sst: m lt gry-lt gry, clr trnsl - mlky Qtz, v f-v crs, sbang - sbrndd, wl-mod srt, r sil cmt, r calc cmt, Tr mic, r carb mat, r glauc, mod-gd vis por

Clst: dk gry - grysh blk, r sdy, sli slty, hd, v Mic, sil cmt, Tr carb mat



3246 – 3269 m MD: Claystones, Sandstones and Coals

Sst: lt brnsh - brnsh gry, lt gry-gry blk, clr trnsl - mlky Qtz, vf - m, sbang - sbrndd, pred wl srt, r mic, r sil cmt, Tr carb mat, r glauc, gd vis por

Clst: dk gry - grysh blk, r sdy, sli slty, hd, v Mic, sil cmt, Tr carb mat,

C: blk, brit, blk, hd, micropyr

3269 – 3276 m MD: Sandstones and Claystones

Sst: lt gry - lt brnsh gry, clr trnsl - mlky Qtz, f - m, pred f, sbang - sbrndd, wl srt, r Glauc, r sil cmt, r mic, r carb mat, gd vis por

Clst: dk gr - grysh blk, olv blk, mod hd - hd, sli slty - sdy, v mic, Tr carb mat, r micropyr

3276 – 3284 m MD: Sandstones and Claystones

Sst: lt gry - m dk gry, clr trnsl - mlky Qtz, vf - f, sbang - sbrndd, wl srt, I.P. hd, v mic, r Glauc, sli sil cmt, r carb mat, no - pr vis por

Clst: grysh blk, v hd, v mic, abd carb mat, sil cmt

3284 – 3290,5 m MD: Sandstones and Claystones with minor Coal

Sst: dk gry, clr trnsl - mlky Qtz, vf - f, sbang - sbrndd, wl srt, r mic, r Glauc, sil cmt, abd carb mat, no vis por

Clst: tbrnsh blk - grysh blk, v hd, v mic, abd carb mat, sil cmt

C: blk, brit, blk, hd, micropyr, carb mat

Lower Tarbert Fm.: 3290,5 - 3310,5 m MD (3175,2 - 3196,2 m TVD)

3290,5 – 3299 m MD: Sandstones

Sst: dk gry, clr trnsl - mlky Qtz, vf - f, sbang - sbrndd, wl srt, r mic, r Glauc, sil cmt, abd carb mat, no vis por

Sst: lt - m gry, lt brnsh gry, clr trnsl - mlky Qtz, vf - f, r m, sbang - sbrndd, wl srt, sli - abd calc cmt, r Glauc, r carb mat, pr - mod vis por

3299 – 3310,5 m MD: Sandstones and Siltstones with minor Coals

Sst: lt - m gry, lt brnsh gry, clr trnsl - mlky Qtz, vf - m, Tr crs - v crs, sbang - sbrndd, mod srt, sli - abd calc cmt, dom lse Qtz gr

Sltst: lt brnsh gry, blk, sft - frm, non calc, I.P. carb

C: blk, brit, blk, hd, micropyr, carb mat

Ness Fm.: 3310,5 - 3497,0 m MD (3196,2 - 3382,7 m TVD)

3310,5 - 3365 m MD: Sandstones, Siltstones and Claystones

Sst: lt - m gry, lt brnsh gry, clr trnsl - mlky Qtz, vf - m, sbang - sbrndd, mod - wl srt, sli - abd calc cmt, tr Kao, r carb mat, abd lse Qtz gr

Sltst: lt brnsh gry, blk, sft - frm, non calc, I.P. carb

Clst: lt brnsh gry - olv gry, blk, frm - mod hd, slty I.P. non calc, abd carb mat

3365 – 3375 m MD: Sandstones

Sst: lt - m gry, clr trnsl - mlky Qtz, vf - m, sbang - sbrndd, mod - wl srt, sli slty, r calc cmt, tr Kao, r carb mat, r micropyr



3375 – 3425 m MD: Sandstones and Claystones with minor Coals and Limestones

Sst: lt - m gry, clr trnsl - mlky Qtz, vf - m, sbang - sbrnrd, mod - wl srt, sli slty, r calc cmt, tr Kao, r carb mat, r micropyr

Clst: m dk gry - olv gry, blk, frm - mod hd, slty I.P. non calc, abd carb mat

C: blk, brit, blk, hd, micropyr, carb mat

Ls: wh-v lt gry, blk, frm, occ sli arg, microxln

3425 – 3480 m MD: Sandstones and Claystones with minor Coals

Sst: lt - v lt gry, clr trnsl - mlky Qtz, f - v crs, sbang - sbrnrd, pr srt, tr lse gr, r calc cmt, Kao, r carb mat, r micropyr, glauc

Clst: dusky yelsh brn - brnsh blk, blk, frm - mod hd, non calc, tr carb mat, r micropyr

C: blk, brit, blk, hd, micropyr, carb mat

3480 – 3497 m MD: Siltstones

Siltst: olv gry - dusky yelsh brn, blk, frm, r sdy, arg, sli calc, Tr carb mat, r micropyr

2.2.2.8 Dunlin Group

3497,0 - 3550,0 m MD (3382,7 - 3435,7 m TVD)

Drake Formation: 3497,0 - 3550,0 m MD (3382,7 - 3435,7 m TVD)

3497 – 3550 m MD: Claystones

Clst: dsky yelsh brn - olv blk, brnsh gry, blk, lam, frm - mod hd, sli slty, non calc, tr carb mat, r micromic, r calc



2.3 Biostratigraphy

The biostratigraphical evaluation of well the 30/11-6 S (1480m - 3550m) was carried out by Geostrat Ltd. Micropalaeontological and palynological analyses have formed the basis for the biostratigraphical interpretation of the well. The analyses were carried out on ditch cuttings and core samples. The results are documented in the report “Norsk Hydro 30/11-6 Biostratigraphy of the interval 1480m - 3550m”.

168 ditch cuttings samples and 19 core samples were analysed for palynology, and 141 ditch cuttings samples for micropalaeontology.

Table 2.4-2 show the summarised geochronologic and lithostratigraphic succession of the well. The interpretation is in accordance with Norsk Hydro’s standard zonation for the area.

All the sample depths are mMD RKB

2.3.1 Major points from 30/11-6 S

- The youngest sediments analysed in the well were assigned to palyno subzone PT8-1, micro zone MOB2, Late Oligocene, Chattanian age.
- The oldest sediments encountered were uncertain, but tentatively assigned to micro zone MJ5B, Early Jurassic, and Middle Toarcian age.
- Several stratigraphical breaks are registered in the well
- An unconformity is seen between the Rogaland Group and the Shetland Group where sediments of the earliest Early Palaeocene are missing
- A major break was encountered between the Kyrre Formation (Shetland Group) and the Åsgard Formation (Cromer Knoll Group), where sediments of the Late Santonian overlies sediments of the Early Barremian. The Cromer Knoll Group is very thin and only the Åsgard Formation is present.
- A break is also seen between the Cromer Knoll Group and the underlying Viking Group where sediments of Hautervian and Valanginian are missing.
- There is a possible unconformity between the Draupne and the Heather formations, where sediments from the Early Volgian and Late Kimmeridgian seem to be missing
- Another stratigraphical break is pointed between the Brent Group and the Dunlin Group, where sediments of latest the Toarcian are missing.

2.3.2 Biostratigraphic summary of the sand units within the Brent Group

Reservoir sands are present within the Tarbert and Ness formations

- The Upper Tarbert Formation (3150m – 3225m log) is of Early Bathonian – Late Bajocian age, assigned to palyno subzone PJ5A2 – PJ4D4.
- The Middle Tarbert Formation (3225m – 3290,50m log) is of Late Bajocian age, assigned to palynozone PJ4D4 – PJ4D2



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- The Lower Tarbert Formation (3290m – 3310,50m log) is of Late Bajocian age, assigned to palyno subzone PJ4D2-?PJ4D1
- The Ness Formation (3310,50 - 3497m log) is of Early Bajocian - Aalenian age, assigned to palynozone PJ4C - PJ3D

2.4 Figures and Tables

Air gap:		29.0 m			
Water depth:		103.5 m			
GROUP	FORMATION	Actual			Thickness
		m MD RKB	m TVD RKB	m TVD MSL	
NORDLAND	Sea bed	132.5	132.5	103.5	
	Pliocene sands	434.5	434.5	405.5	140
	Utsira	574.0	574.0	545.0	175
HORDALAND	Skade	749.0	749.0	720.0	398
	Undifferentiated	1150.0	1146.8	1117.8	379
	Grid Sands	1561.0	1525.6	1496.6	54
	Green Clay	1620.0	1579.3	1550.3	597
ROGALAND	Balder	2270.0	2176.2	2147.2	63
	Sele	2337.0	2238.7	2209.7	114
	Lista	2457.0	2352.4	2323.4	105
	Våle	2565.0	2457.1	2428.1	72
	Hardråde	2638.5	2528.7	2499.7	203
	Kyrre	2845.5	2731.5	2702.5	110
CROMER KNOLL	Åsgard	2955.5	2841.2	2812.2	5
VIKING	Draupne	2960.5	2846.2	2817.2	33
	Heather	2993.0	2878.7	2849.7	95
	Lower Heather	3088.0	2973.7	2944.7	62
BRENT	Upper Tarbert	3150.0	3035.7	3006.7	75
	Middle Tarbert	3225.0	3110.7	3081.7	65
	Lower Tarbert	3290.5	3176.2	3147.2	21
	Ness	3310.5	3196.2	3167.2	187
DUNLIN	Drake	3497.0	3382.7	3353.7	53
TD		3550.0	3435.7	3406.7	-

Table 2.4-1. Formation tops table



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Biostratigraphy			Lithostratigraphy			
Period	Epoch/age	Depth mMD	Group	Formation	Depth mMD	
PALEOCENE	Late Oligocene (top not seen)	1480.00m	Hordaland (top not seen)		1480.00m	
	Early Oligocene	1500.00m			1561.00m log	
	Late Eocene	1720.00m	Rogaland	Grid Sands		
	Middle Eocene	1860.00m				
	Early Eocene	2180.00m		Balder Sele	2270.00m log 2337.00m log	
	Late Palaeocene	2400.00m		Lista Våle	2457.00m log 2565.00m log	
	Early Palaeocene	2630.00m				
UNCONFORMITY						
LATE CRETACEOUS	Late Maastrichtian	2650.00m	Shetland	Hardråde	2638.5.00m log	
	Early Maastrichtian	2709.00m				
	Late Campanian	2829.00m		Kyrre	2845.5.00m log	
	Middle Campanian	2871.00m				
	Early Campanian	2913.00m				
	Late Santonian	2925.00m				
	UNCONFORMITY					
EARLY CRETACEOUS	Early Barremian	2958.00m	Cromer Knoll	Åsgard	2955.5.00m log	
UNCONFORMITY						
	Late Ryazanian	2964.00m	Viking	Draupne	2960.50m log	
LATE JURASSIC	Late Volgian	2973.00m				
	Middle Volgian	2985.00m				
	?UNCONFORMITY					
		?Early Volgian-Kimmeridgian	2994.00m		Heather	2993.00m log
		earliest Kimmeridgian	3003.00m			
		Late Oxfordian	3012.00m			
	Middle Oxfordian	3039.00m				
UNCONFORMITY						
MIDDLE JURASSIC	Middle Callovian	3051.00m	Brent			
	Early Callovian	3057.00m				
	Late Bathonian	3087.00m		Lower Heather	3088.00m (log)	
	Middle - ?Early Bathonian	3129.00m		Upper Tarbert	3150.00m log	
	Early Bathonian	3156.00m				
	Late Bajocian	3174.00m				
	Early Bajocian	3315.00m		Middle Tarbert	3225.00m log	
Aalenian	3474.00m	Lower Tarbert	3290.50m log			
		Ness	3310.50m log			
UNCONFORMITY						
EARLY JURASSIC	Late Toarcian	3501.00m	Dunlin	Drake	3497.00m log	
	?Middle Toarcian	3519.00m				
	TD	3550.00m				

Table 2.4-2. Geochronologic and Lithostratigraphic succession

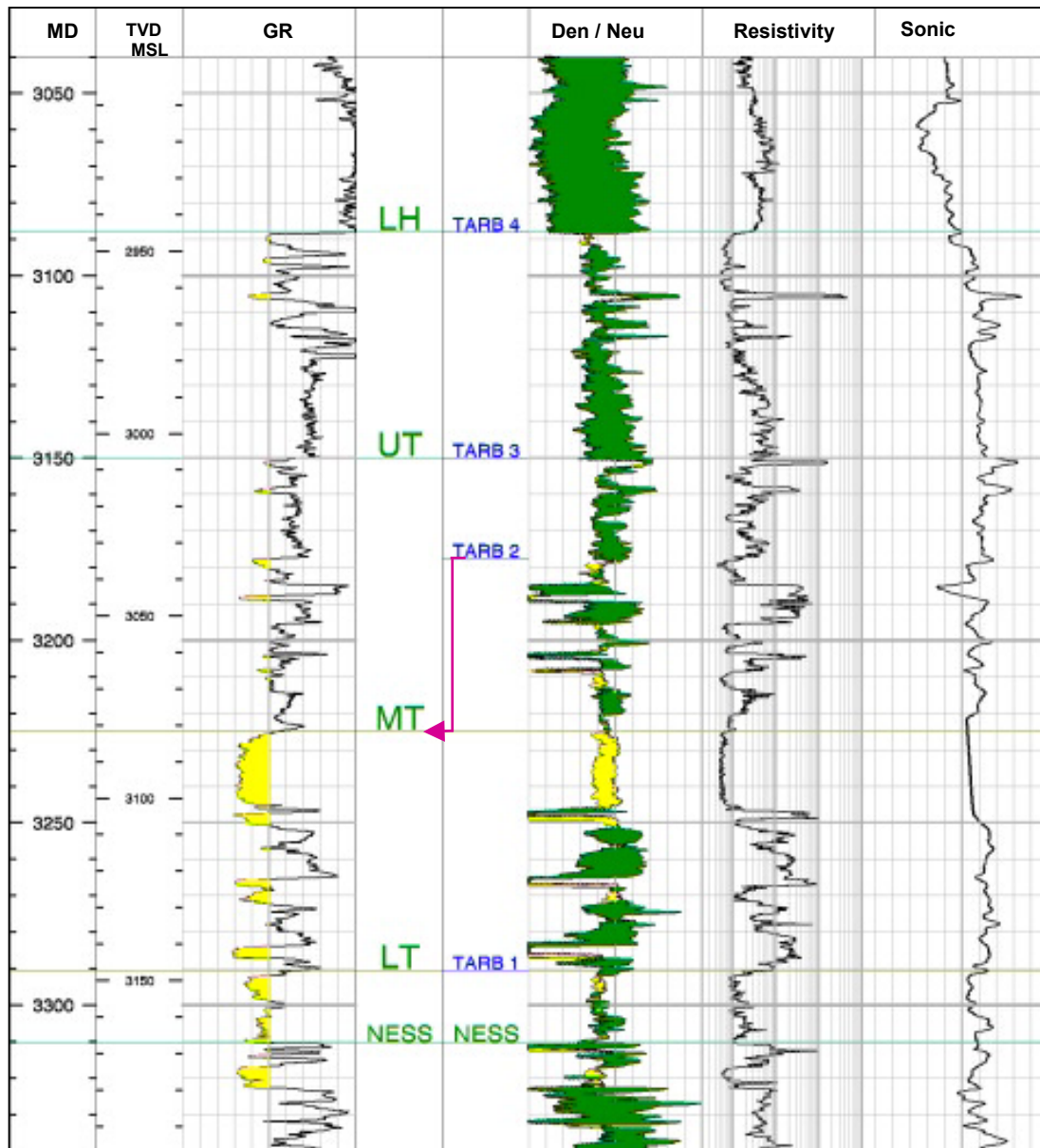


Figure 2.4-1. Wire Line Logs reservoir section

with reservoir zonation. Both the zonation scheme used in this report and the scheme used in the prognosis is shown.

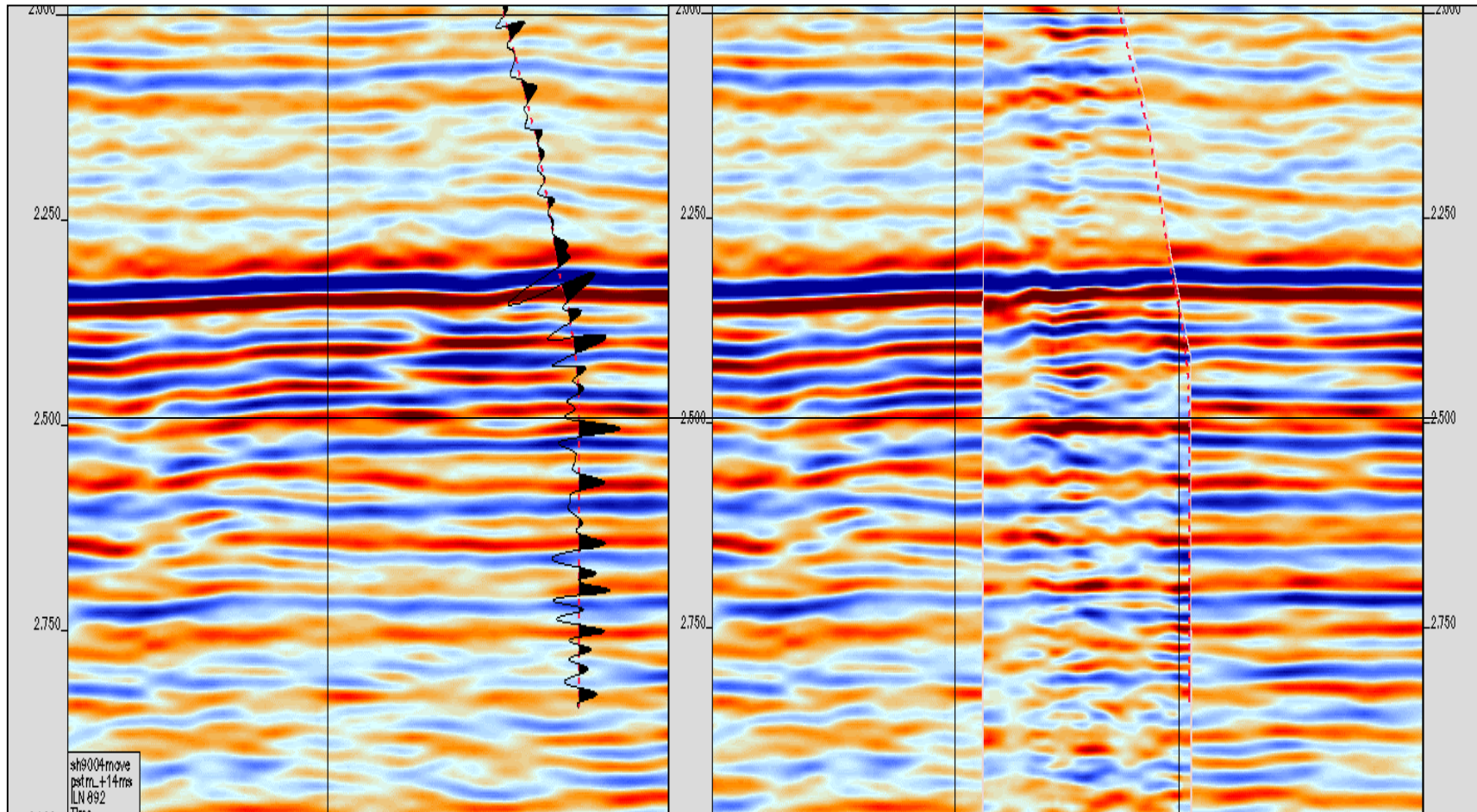


Figure 2.4-2. Corridor stack (left) and VIVSP (right) spliced into surface seismic SH9004. The surface seismic is shifted +14 ms TWT to fit the corridor stack and VSP. An increase in impedance is displayed as a blue trough. Shallow casing causes some ringing on the VSP display



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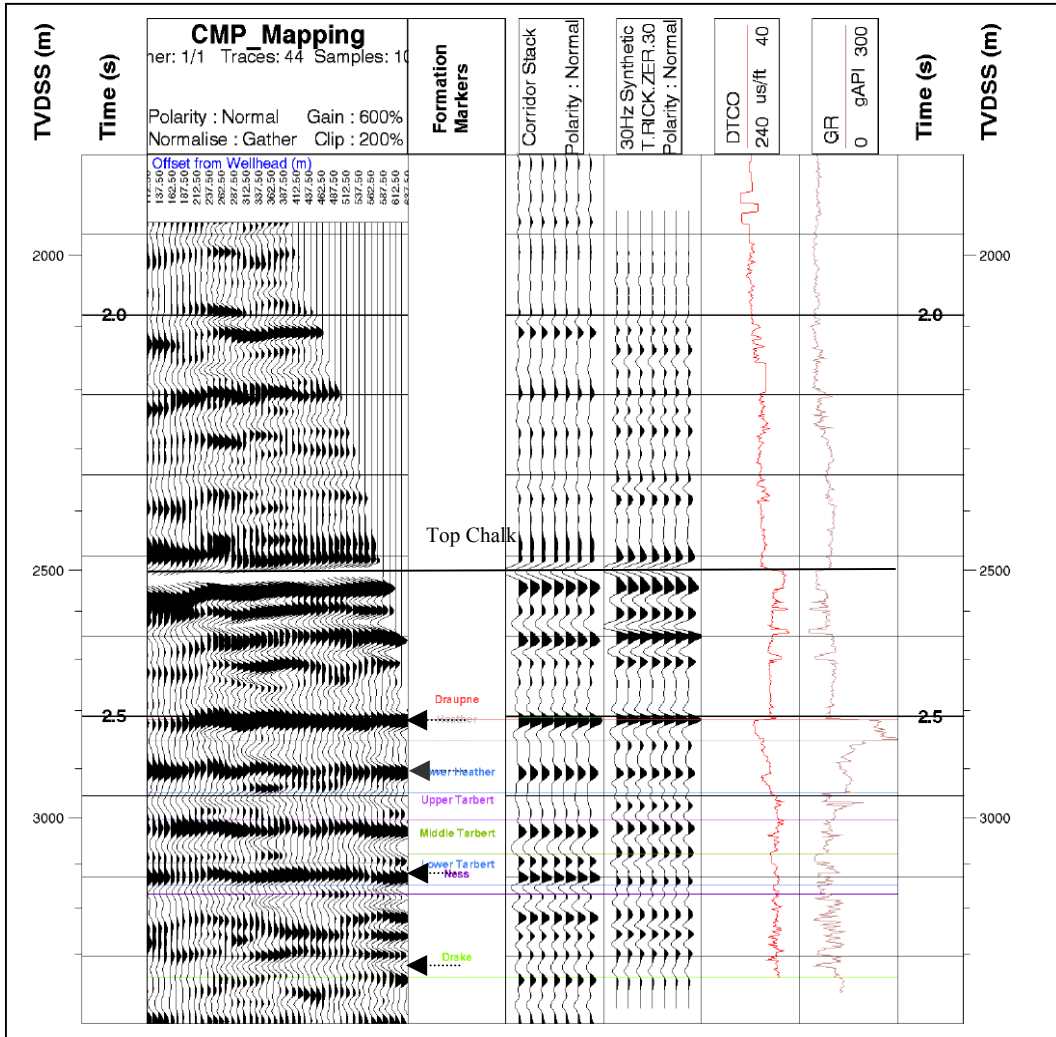


Figure 2.4-3. Composite Display

(normal polarity) showing VSP, zonation, synthetic seismogram, sonic and GR logs. Arrows indicate the event interpreted before drilling, from top BCU, top Tarbert 4b, top Ness and top Dunlin

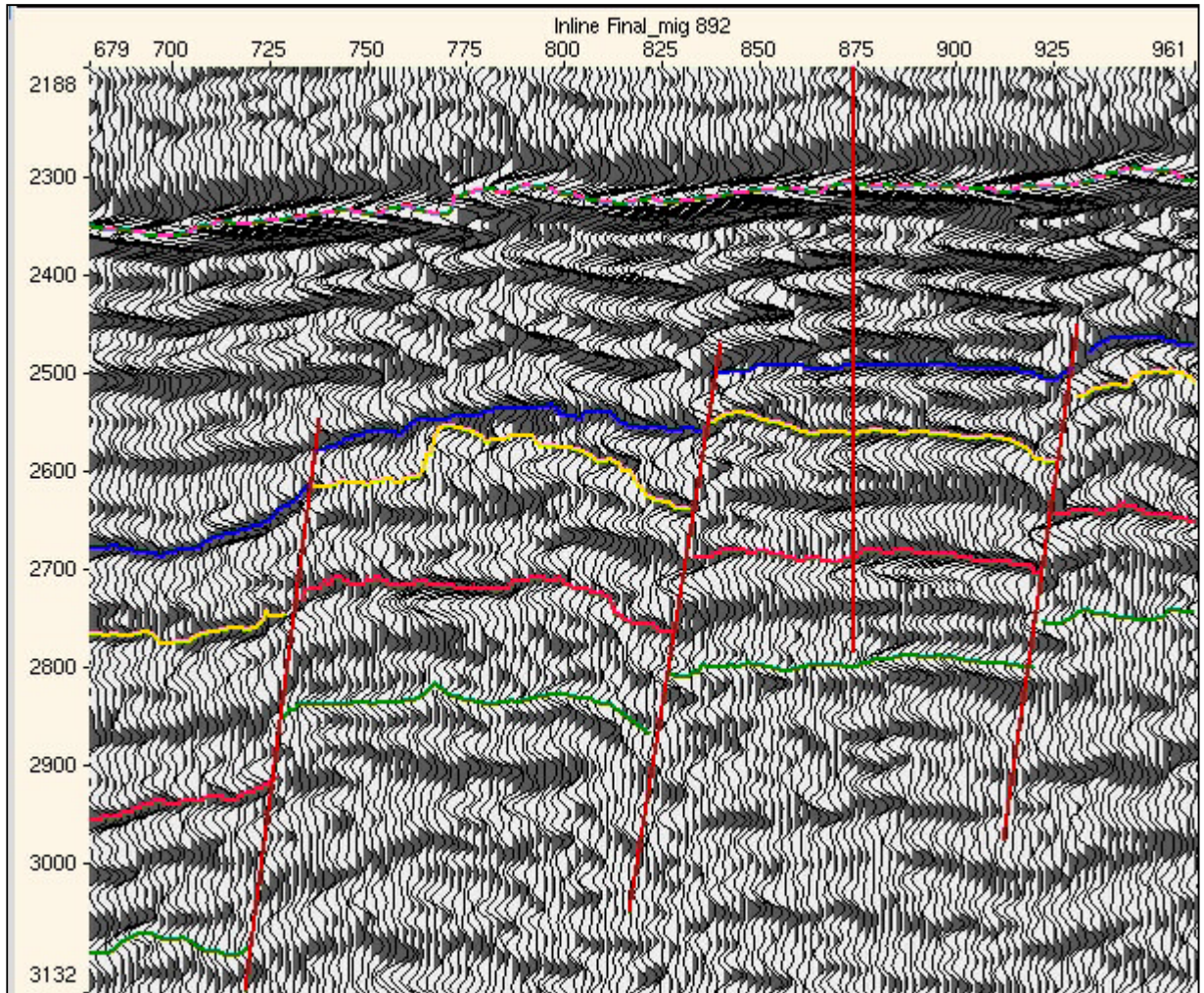


Figure 2.4-4. Seismic section along the well path.

The pre-well interpretation is solid-drawn; approximate post-well interpretation is shown as a dashed line. Location in Figure 2.4-5. Top reservoir map,.

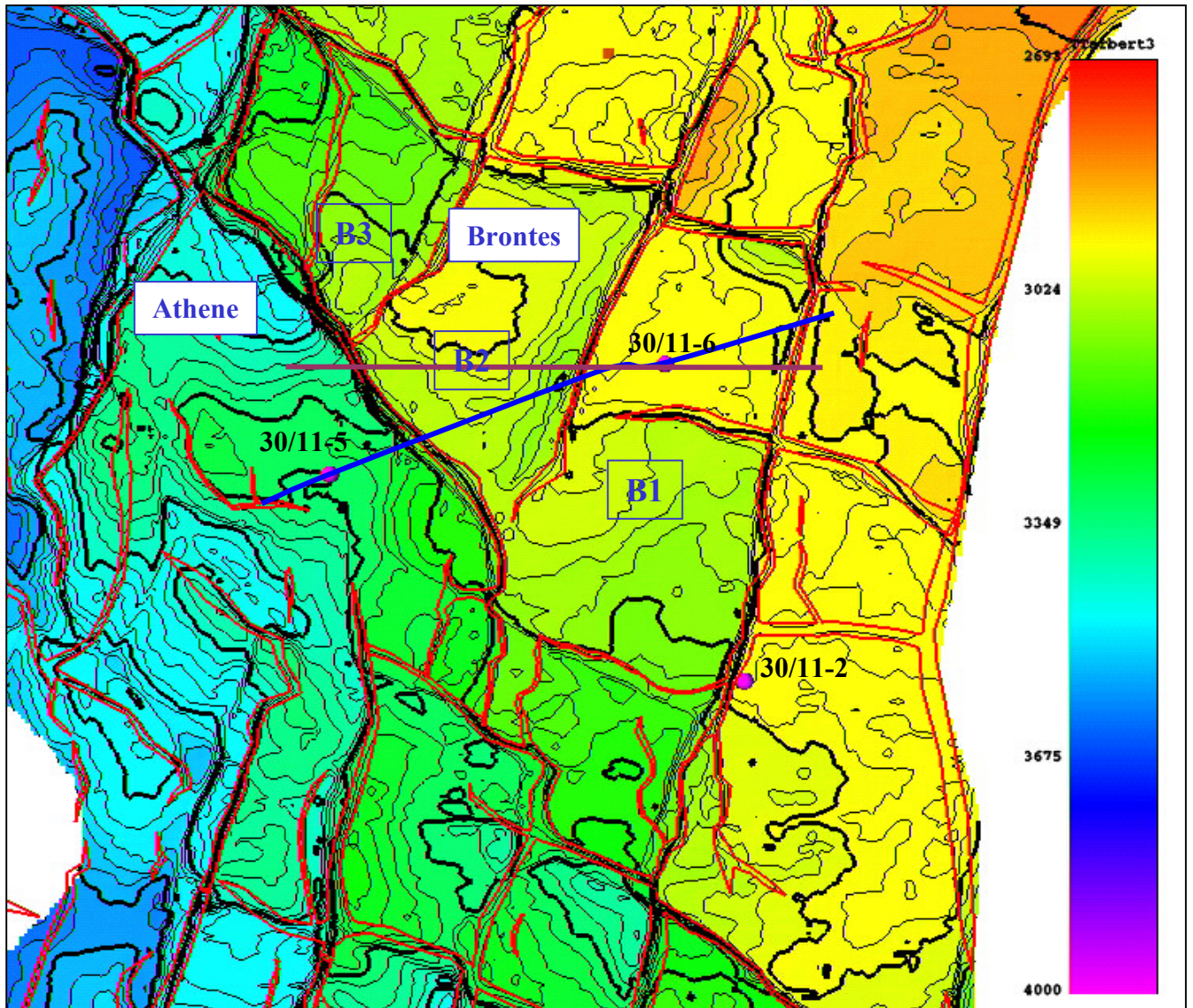


Figure 2.4-5. Top reservoir map,

i.e. top Tarbert 3 as in the prognosis and Upper Tarbert following the new zonation. The map has not been updated after drilling the well. Location of **Figure 2.4-4. Seismic section along the well path**, in violet and of **Figure 2.4-6. Seismic correlation** in blue.

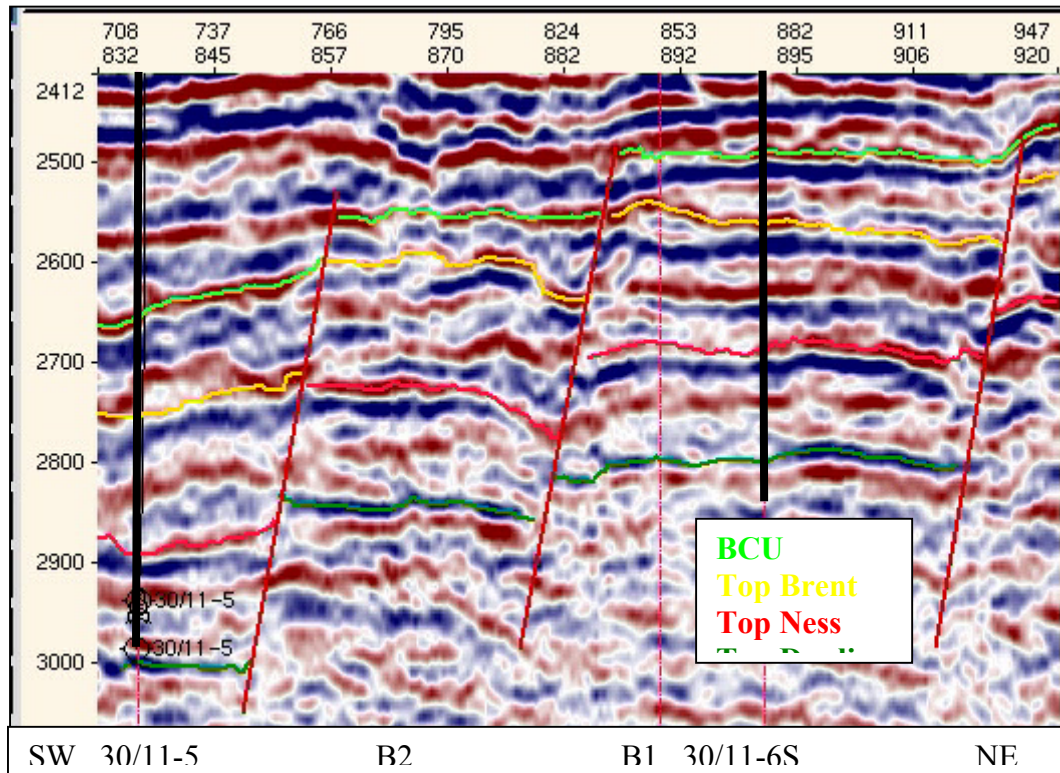


Figure 2.4-6. Seismic correlation

to the 30/11-5 well before drilling the 30/11-6S well. Location in **Figure 2.4-5. Top reservoir map,**



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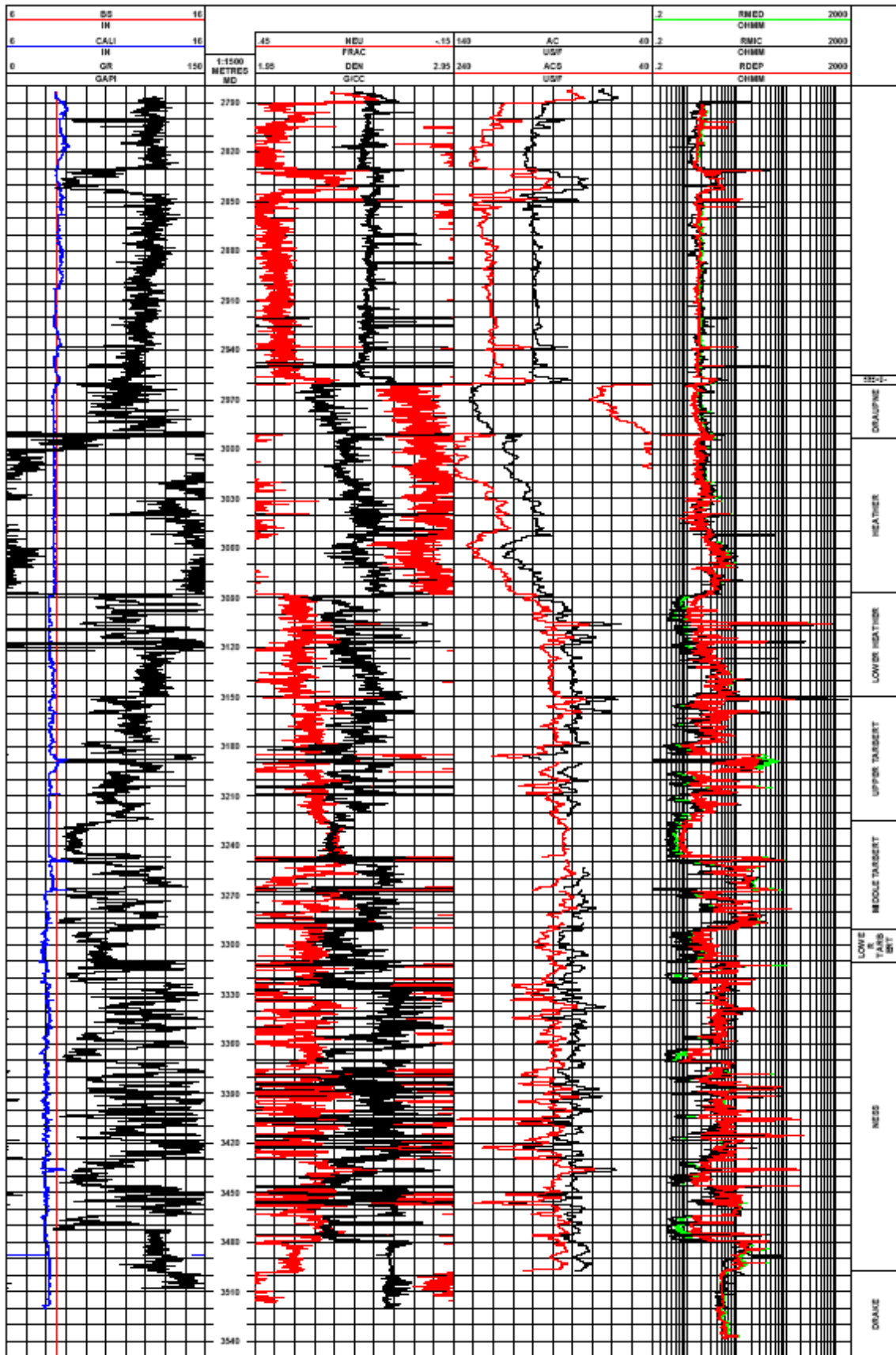


Figure 2.4-7. Raw logs



3 PETROPHYSICAL EVALUATION

3.1 Discussion

The petrophysical interpretation is based on high-resolution wire-line logs sampled at 0.0508 meters and core data. The data quality and input parameters are discussed in the following chapters.

3.2 CPI input data and quality

The formation evaluation data acquisition includes:

- LWD logs
- WL logs
- Conventional / Special core analysis

3.2.1 LWD Logs

Baker Hughes provided the LWD services for the well 30/11-6 S, according to the table below. The data are of good quality.

Section	Sensors	Drilled from (m MD RKB)	Drilled to (m MD RKB)	Comments
17½"	GAM-TEMP-REMP	231	1415	MPR
12¼"	GAM-TEMP-REMP-BHPR	1415	2700	MPR
8½"	GAM-TEMP-REMP-BHPR	2700	3550	OnTrak

Table 3.2-1 LWD-services run in well 30/11-6 S

3.2.2 Wire-line Logs

The wire-line-logs run in well 30/11-6 S are summarized in [Table 3.2-2 FE Wireline services run in 30/11-6 S](#). The HRLA-MSIP-PEX in run 1A covered the entire reservoir interval. The MSIP was also run inside the 9 5/8" casing. Both the open-hole and cased-hole MSIP was later reprocessed by Schlumberger.

Although logging of the 8 ½" hole was complicated by a lot of sticking, the wire-line logs are of good quality. The interval is recorded in three files as logging had to be stopped due to the troublesome sticking. Schlumberger provided a merged log of the three original files recorded. Apart from a few meters immediately below the 9 5/8" casing shoe (inside the rat-hole), no data was recorded between the 9 5/8" casing shoe and 2783 m. as the tool got stuck and it was decided not to drop down to re-log the interval.



Run #		Logged from (m MD RKB)	Logged to (m MD RKB)	Comments
1A	HRLA-MSIP- PEX	3530	2783	Due to sticking, no data is recorded between 2783 and 9 5/8" csg. shoe
1A	MSIP-CH	2682	2090	MSIP was also recorded inside the 9 5/8" casing
1A	MDT pretests	3091	3469	No sampling was done

Table 3.2-2 FE Wireline services run in 30/11-6 S

3.2.3 Composite Logs

The composite logs were made by PTI in accordance with the NPD requirements. One composite is a hybrid containing a combination of LWD logs and wireline logs covering the entire well. This composite has curves sampled at standard sample rate, 0.1524 m. The other composite log generated (Petrophysics) is limited to the 8 1/2" reservoir section and contains only the curves used for the petrophysical interpretation. Curves contained in this log are of high-resolution sampling rate, 0.0508 m.

3.2.4 Core Data

Three cores were cut in this well. The core recovery was good (100%).

Core No.	Reservoir zone	Cored interval		Recovery (m)	Shift to log depth (m)
		Drillers depth (m MD RKB)	Log depth (m MD RKB)		
1	Tarbert	3196.0-3214.4	3195.4-3213.8		-0.6
2	Tarbert	3214.4-3269.0	3213.8-3268.4		-0.6
3	Tarbert	3269.0-3299	3268.4-3298.4		-0.6

Table 3.2-3 Cored interval, recovery and depth shift

Well 30/11-6 S	Top	Bottom	PHI log	PHI core	Permeability core
ZONE	MD RKB [m]	MD RKB [m]	AR [frac]	AR [frac]	[mD]
Cored interval	3195.4	3299.4	0.188	0.186	1487.8

Table 3.2-4 Log and core average porosity

Routine core analysis was carried out at regular intervals. The SCAL program was limited to Dean & Stark and Retort measurements carried out on selected plugs.

To get the cores on depth with the logs, a block shift of -0.6 meters have been applied to all three cores.



3.2.5 MDT Pressure

The Schlumberger Modular Dynamic Tester (MDT) wire-line tool was used for measuring formation pressures. One run was carried out, and no sampling was attempted.

3.2.5.1 Pressure Points

34 tests were attempted during MDT run 1A, of which 23 are considered successful, one is a lost seal, and two are supercharged while eight are tight tests.

Test No.	File No.	Depth m TVD MSL	Depth m MD RKB	FMP BAR	MOB	Qual	Comments
32	131	2947,71	3090,97	306,5637	33,28	3	
31	130	2958,21	3101,5	307,519	34,4	3	
30	129	2963,72	3106,96	308,1697	10,09	3	
28	127	3034,72	3178	319,183	10,98	3	
25	125	3058,21	3201,46	321,2167	9,68	2	
24	124	3067,21	3210,48	321,0283	36,49	3	
23	123	3082,81	3226,01	322,4219	70,54	3	
22	122		3232	323,0199	105,91	4	
21	121	3093,72	3237	323,5074	107,83	4	
19	119	3099,72	3242,99	324,0937	168,63	4	
18	118	3106,72	3250	323,7345	27,38	3	
9	112	3149,22	3292,46	327,2452	1,7	2	
7	111	3151,71	3295	327,1287	13,62	3	
6	110	3165,67	3308,96	328,8072	4,26	2	
15	97	3174	3317,29	330,1383	21,53	3	
14	96	3223,2	3366,49	334,8306	77,9	3	
13	95	3225,21	3368,5	335,0302	93,28	3	
2	106	3298,69	3441,98	343,1411	6,57	2	
4	90	3299,71	3443	343,58	0,79	2	
1	105	3300,68	3443,97	343,3095	30,9	3	
2	89	3321,3	3464,59	344,6161	47,47	3	
1	87	3325,77	3469,06	345,0508	7,55	2	
12	94	3261,22	3404,51	338,8171	1,85	2	
9	92	3297,45	3440,56	233,3465	0,44	1	Tight
26	126	3034,72	3178	332,3298	6,41	0	Supercharged
20	120	3093,72	3237	450,999	1,9	0	Lost Seal
29	128	3010,72	3153,98	224,9944	44,63	1	Tight
17	117	3125,72	3269,01	307,3455	1,85	1	Tight
16	116	3126,72	3269,98	322,4415	0,83	1	Tight
12	114	3127,72	3271	320,8004	0,92	1	Tight
13	115	3128,22	3271,49	320,5835	1,52	1	Tight
10	113	3149,72	3293,01	295,5846	21,66	1	Tight
5	91	3296,72	3440,01	344,6024	0,13	0	Supercharged
5	109	3166,22	3309,49	329,8727	4	1	Tight

Table 3.2-5 Listing of MDT pressure tests



3.2.6 Corrections

For both wireline and LWD logs, please see information from service companies for environmental corrections.

Depth corrections were applied to both wireline and LWD logs. Due to severe sticking and pulling during logging, the MDT GR down log is used for depth reference in open hole, while the MSIP recorded is used as depth reference inside the 9 5/8" casing after having been block shifted to match the MDT GR down log. Shift curves applied are stored in Recall.

3.3 Evaluation Method

The petrophysical evaluation of well 30/11-6 S is described in the following chapters. This interpretation is based on the available logs and cores.

The petrophysical results are listed in Table 3.3-2 Petrophysical averages, and plotted in Figure 3.7-5 CPI, Upper Part and Figure 3.7-6 CPI, Lower Part.

3.3.1 Net Sand / Shale Volume

The net sand intervals were determined by applying a shale volume cut off of 0.40 and porosity cut off of 0.14.

The shale volume has been calculated from a minimum of a linear relationship with the gamma ray and a density-neutron x-plot. The reservoir interval is primarily a straightforward sand-shale sequence, and the relative abundance of sand / shale is well defined by the two methods.

Layers of coal has been automatically picked from the logs and subtracted from the Net Sand.

3.3.2 Porosity

The effective porosity has been calculated using a model based on the density log calibrated to the overburden corrected core helium porosity. This effective porosity is corrected for shale volume.

Parameters for estimation of porosity have been picked for x-plots and from visual inspection of the logs. The entire reservoir is water bearing, so only one value of RHO_{fl} applies. This value is estimated by x-plotting of OBC core porosity versus $RHOB$ and extrapolated 100% porosity. RHO_{fl} is estimated to be 1.04 g/cc and is in agreement with the water gradient from the MDT of 1.01 g/cc. A somewhat denser fluid is expected in the flushed zone due to invasion of the heavier mudfiltrate.

The conventional core porosity were measured every 25 cm where possible. These were helium porosity at ambient conditions. The core porosity was then corrected for overburden stress to estimate in-situ porosity. From regional experience, an overburden compaction factor of 0.97 was then applied. (See core report for details).

The matrix density (ρ_{ma}) has been estimated from histograms of core grain density and set to 2.66 g/cc.



3.3.3 Water Saturation

The Indonesia equation was used to calculate the water saturation from the logs. The formation water resistivity used is the same as for the Oseberg South area. The formation temperature was established from the traditional approach of making a picket-plot of the observed cable head temperatures from the different wireline runs. This gives a static bottom hole temperature of 121deg. C at 3500 m MD RKB. This corresponds to a temperature gradient of approx. 3.54 deg. C /100 m.

3.3.4 Petrophysical input parameters

The petrophysical input parameters used for well 30/11-6 S are given in Table 3.3-1 Petrophysical input parameters. As core data only exists for a limited part of the reservoir, the same set of parameters has been used throughout the reservoir.

The cementation factor m , has been set to 1.75 for the upper part of Middle Tarbert due to the highly permeable nature of the sand. For the remaining reservoir section, m has been set to 2.0.



Petrophysical Input Parameters													
Formation	Shale Volume						Porosity			Water saturation			
	GRcl	GRsh	RHOBcl	NPHIcl	RHOBsh	NPHIsh	RH Oma	RHOfl	RHOsh	a	m	n	RESsh
Cromer Knoll	52	134	2.65	-0.02	2.60	0.30	2.66	1.04	2.60	1	2	2	30
Draupne	48	149	2.65	-0.02	2.60	0.30	2.66	1.04	2.60	1	2	2	30
Heather	48	149	2.65	-0.02	2.60	0.30	2.66	1.04	2.60	1	2	2	30
Lower Heather	48	149	2.65	-0.02	2.60	0.30	2.66	1.04	2.60	1	2	2	30
Upper Tarbert	48	149	2.65	-0.02	2.60	0.30	2.66	1.04	2.60	1	2 ^{*)}	2	30
Middle Tarbert	48	149	2.65	-0.02	2.60	0.30	2.66	1.04	2.60	1	2	2	30
Lower Tarbert	48	149	2.65	-0.02	2.60	0.30	2.66	1.04	2.60	1	2	2	30
Ness	48	149	2.65	-0.02	2.60	0.30	2.66	1.04	2.60	1	2	2	30
Drake	48	149	2.65	-0.02	2.60	0.30	2.66	1.04	2.60	1	2	2	30
^{*)} Tarbert 2C	48	149	2.65	-0.02	2.60	0.30	2.66	1.04	2.60	1	1.75	2	30

Table 3.3-1 Petrophysical input parameters



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Well 30/11-6 S	Top	Bottom	Thickness		NTG	PHI log	S _w log
			Gross [m TVD]	Net Sand [m TVD]			
ZONE	TVD MSL [m]	TVD MSL [m]			[frac]	AR-P&TW [frac]	AR-P&TW [frac]
CROMER KNOLL	2812.2	2817.2	5.0	0.00	0.00	-	-
DRAUPNE	2817.2	2849.7	32.5	0.00	0.00	-	-
HEATHER	2849.7	2943.7	94.0	0.00	0.00	-	-
LOWER HEATHER	2943.7	3006.7	63.0	8.79	0.14	0.199	0.899
UPPER TARBERT	3006.7	3081.7	75.0	21.00	0.28	0.182	0.854
MIDDLE TARBERT	3081.7	3147.2	65.5	25.39	0.39	0.193	0.945
LOWER TARBERT	3147.2	3167.2	20.0	13.72	0.69	0.187	0.871
NESS	3167.2	3353.7	186.5	40.39	0.22	0.197	0.863
DRAKE	3353.7	3406.7	53.0	0.00	0.00	-	-

Table 3.3-2 Petrophysical averages

Well 30/11-6 S	Top	Bottom	PHI log	PHI core	Permeability core
ZONE	MD RKB [m]	MD RKB [m]	AR [frac]	AR [frac]	[mD]
Cored interval	3195.4	3299.4	0.188	0.186	1487.8

Table 3.3-3 Log and core porosity average



3.4 Fluid System

3.4.1 Formation pressure analysis

The interpretation of the formation pressures is based on MDT formation pressure tests.

The well is considered water bearing and no hydrocarbon bearing zones are identified either from logs or pressure data.

3.5 Formation Pressure Points and Electrical Log Interpretation

Both logs, pressures and plug measurements are in agreement that no moveable hydrocarbons are identified in this well. Some intervals of residual oil can be seen from the log interpretation.

Pressure data clearly show water gradients throughout the Tarbert and Ness Formations (Figure 3.7-2). The two gradients have the same slope (0.099 Bar/m), but the pressure in Ness is approximately 1.4 bars lower.

	Water gradient	
Tarbert	1.01 g/cc	0.099 m/bar
Ness	1.01 g/cc	0.099 m/bar

Table 3.5-1 Fluid gradients from pressure interpretation

3.6 Pressure and temperature summary.

3.6.1 General

The pore pressure-, fracture -, and overburden gradients are presented graphically in Figure 3.7-3. The temperature gradient is shown in Figure 3.7-4. All depths are in meters true vertical depth (TVD), relative to rotary table, unless otherwise stated.

Air gap was 22 m and water depth 132 m RKB. The pore pressure-, fracture -, and overburden gradient are given in Equivalent Mud Density, g/cm³ or sg.

3.6.2 Pore pressure gradient

A normal pore pressure gradient (1,03sg) was observed from seafloor down to top Eocene. The pore pressure increases steadily through Eocene reaching approximately 1.30sg or less towards base of Eocene and into top Balder fm. before the pore pressure dropped steadily through Rogaland towards 1,04sg close to base Rogaland / top Shetland. A small increase in pressure was observed in Kyrre and Draupne to 1,06sg. The MWD-logs, drilling parameters and Total Gas all supported the prognosed pressure profile.

The heterogenetic Brent reservoir was tested with MDT and the data indicates a pressure compartmentalisation of the reservoir with restricted communication between most of the individual sands. The reservoir was normally to slightly overpressured with a water gradient in communicating sands.



3.6.3 Fracture gradient

The fracture gradient was based on the assumed rock mechanical properties to each stratigraphical layer (Daines (1982)), Eckels & van Breckelen and adjusted to leak off tests in nearest reference wells.

The two LOT's taken was higher than the minimum fracture gradient prognosis and there was no mud losses or other hole instability indications.

3.6.4 Overburden gradient

Overburden gradient is based on density log readings from reference wells.

3.6.5 Temperature gradient

The temperature gradient (Figure 3.7-4) was calculated based on the Horner plot obtained from the three wire-line logging runs. The Horner plot gave 123⁰C at 3361m TVD. This gave a temperature gradient of 3,81⁰C / 100m, assuming 4⁰C at seafloor. This result was in the lower range of the expected temperature based on the regional dataset.



3.7 Figures and Tables

Water Saturation Input Parameters

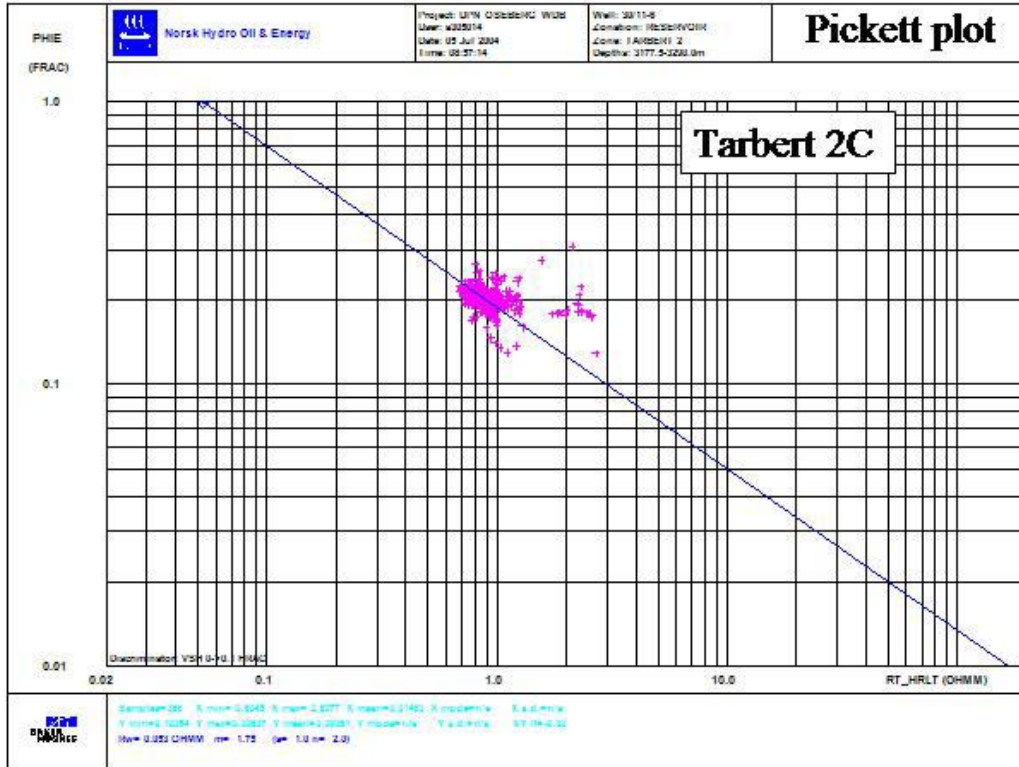


Figure 3.7-1 Water saturation parameters

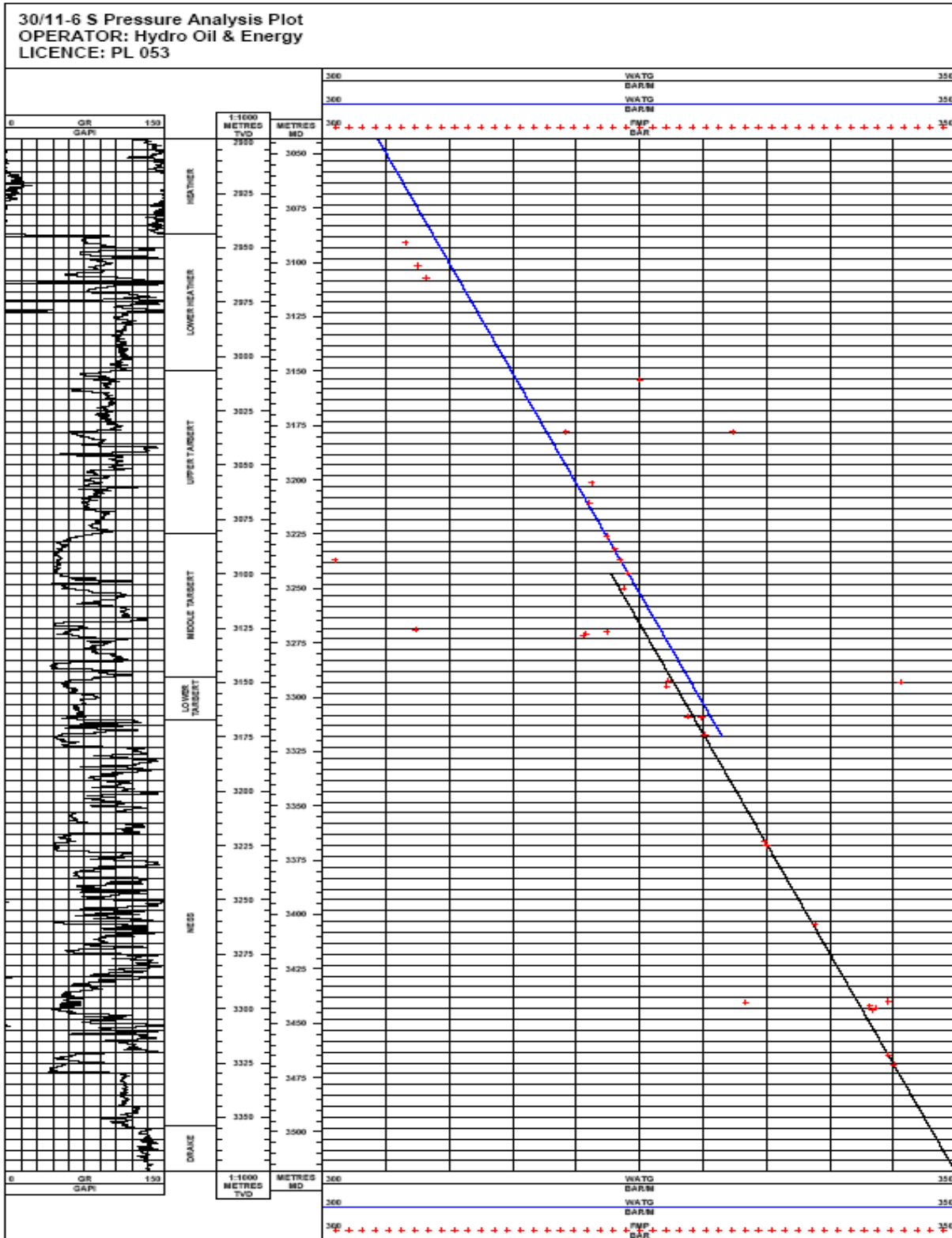


Figure 3.7-2 Formation pressure analysis



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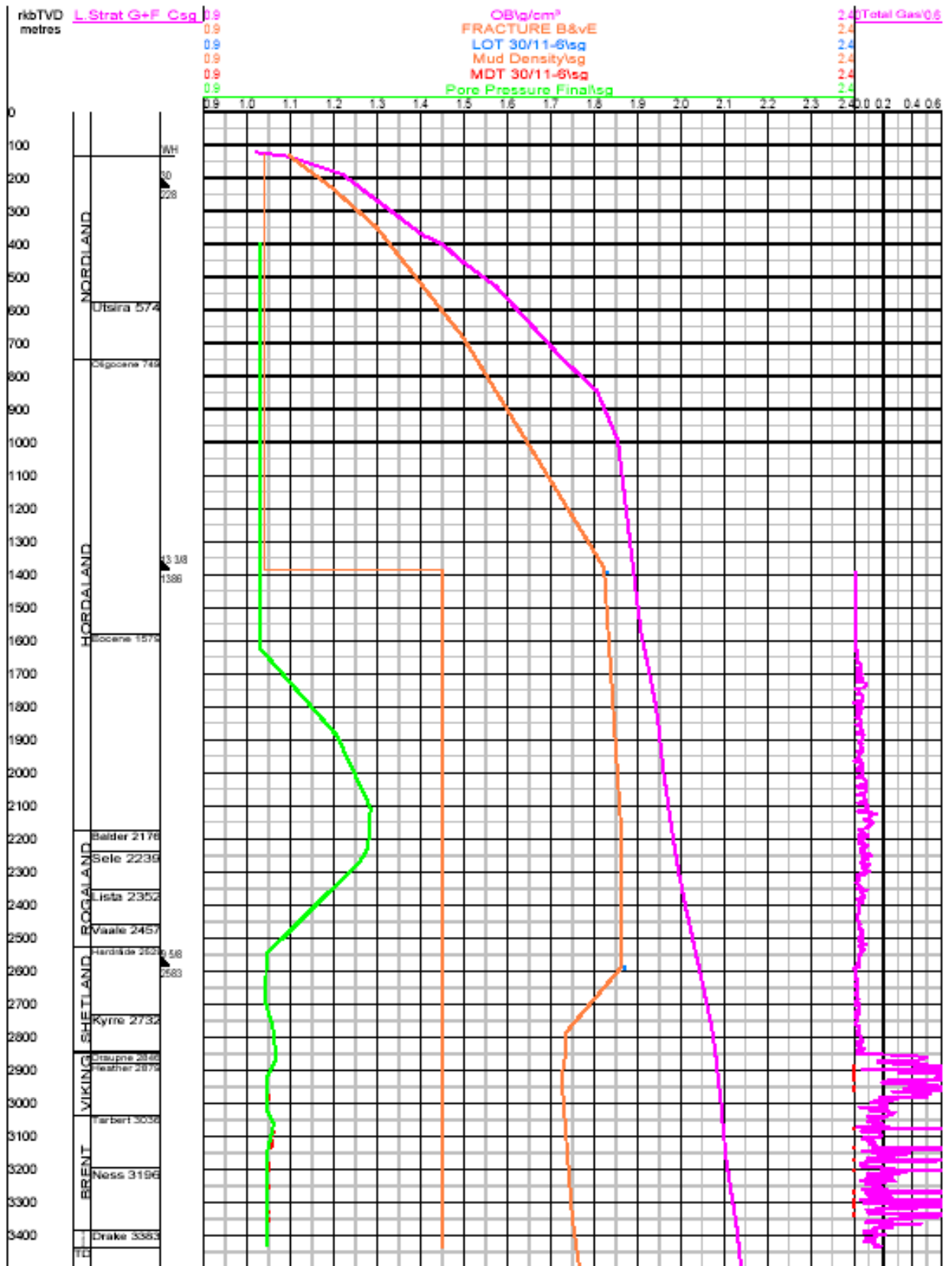


Figure 3.7-3. Formation Pressure, Overburden and Fracture Pressure plot



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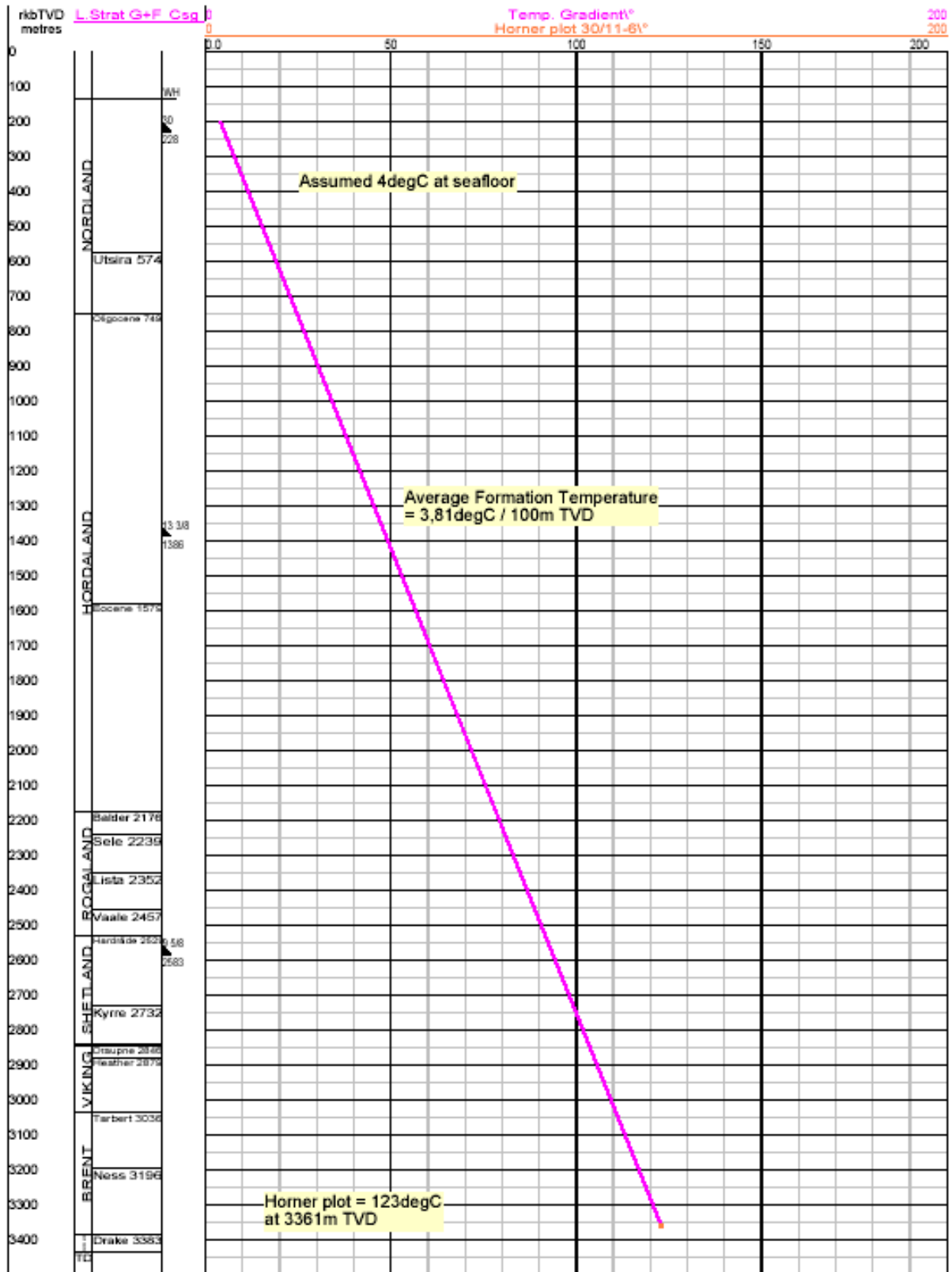


Figure 3.7-4. Formation Temperature plot

The temperature-log indicates measured and corrected value, and all relevant data for determination of local geothermal gradients in a well at thermal equilibrium.



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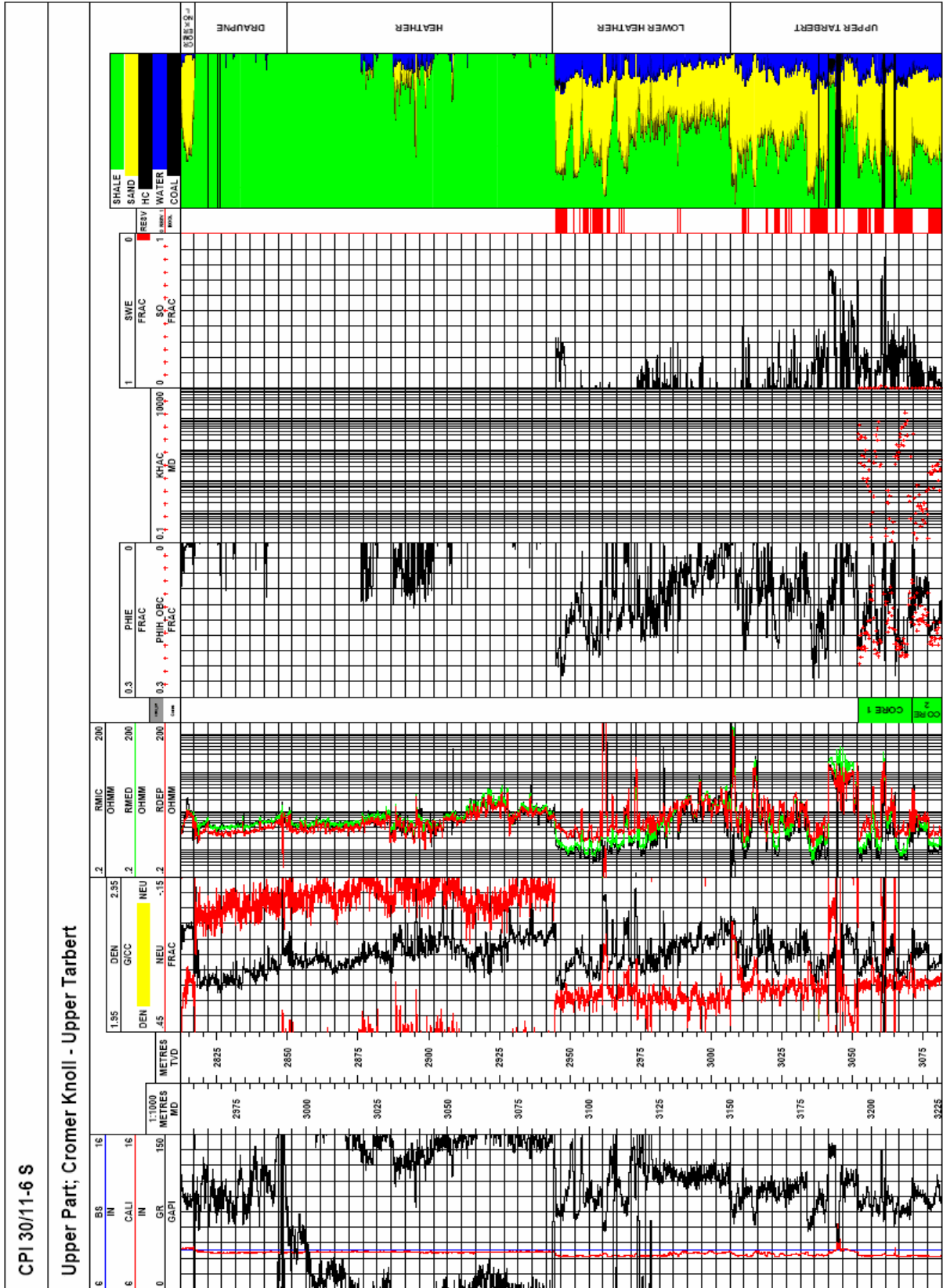


Figure 3.7-5 CPI, Upper Part



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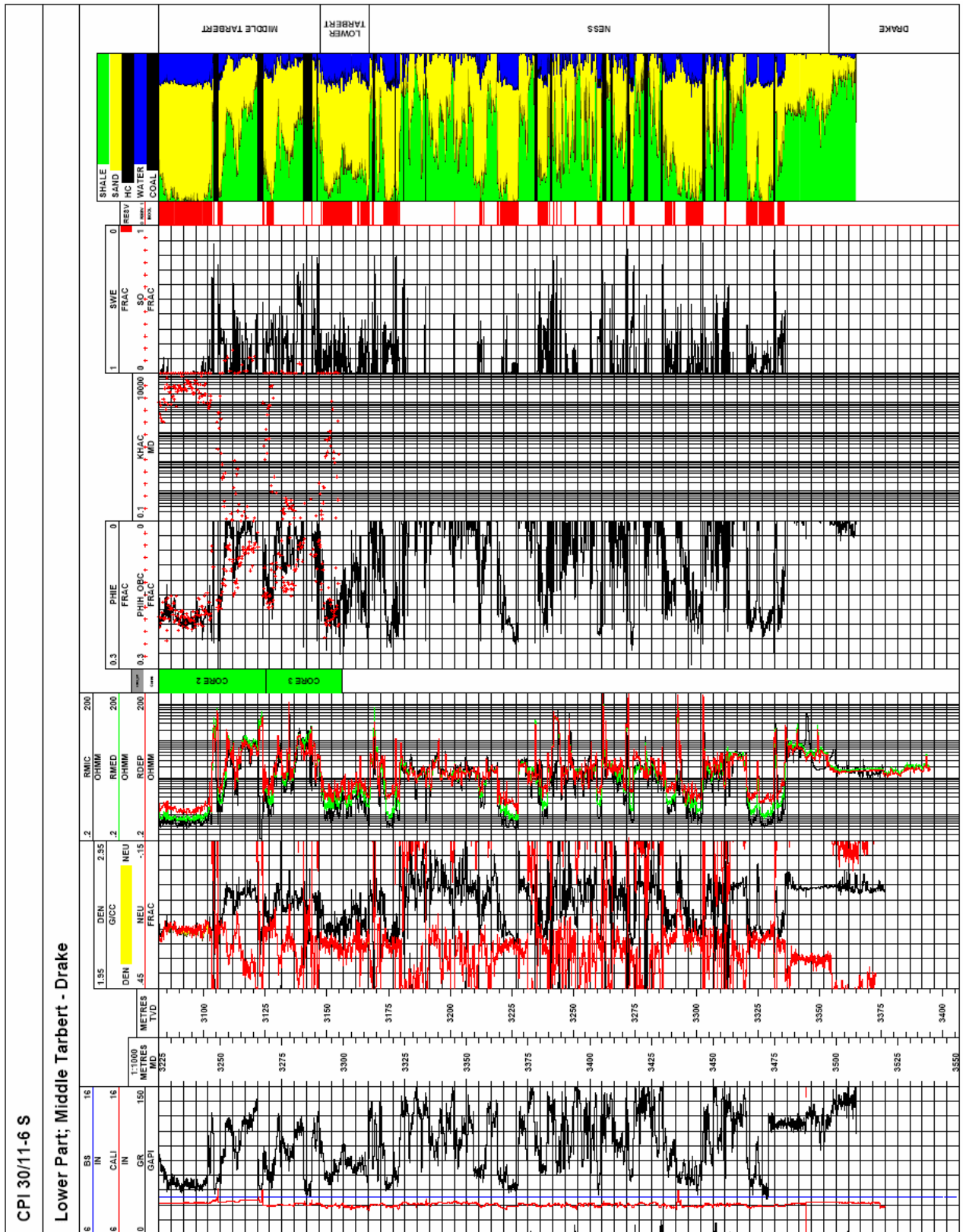


Figure 3.7-6 CPI, Lower Part



3.8 Geochemical Results

3.8.1 Sampling Program

This report details the identification and characterisation of oil shows in well 30/11-6 S. A detailed sampling program was established for the well involving collection of ditch cutting samples every 10m until the Base Cretaceous then every 3m down to TD. Additionally, gasbag samples were collected every 100m until Base Cretaceous, then every 10m until TD.

All geochemical data used in this report has been imported into Petrobank.

Geochemical Work Program

The following geochemical analyses were initiated,

1. Headspace gas analyses (173 canned samples)
2. FIS (Fluid Inclusion Stratigraphy) (387 cuttings samples)
3. Solvent Extraction and deasphalting (21 core samples and 1 mud sample)
4. Iatroscan (7 core samples and 1 mud sample)
5. GCMS (7 core samples and 1 mud sample)

3.8.2 Oil Shows Identification

Oil shows were identified whilst drilling between 3177-3196m MD RKB (cuttings samples) and throughout the cored section (3196-3299m MD RKB) by the well site geologist (see composite log or Final Well Report).

Bulk geochemical analyses (Headspace Gas and FIS) have revealed that extensive oil/gas shows are present at depths between 2200m MD RKB to TD.

The Headspace gas data was collected between 1500m–3195 m MD RKB. High gas abundances identified between 1500m-1920m MD RKB (Green Clay Fm), however this is predominantly methane and mostly biogenic. Gas abundances decrease steadily from 1920m to 2340m MD RKB (Green Clay Fm to Top Sele Fm), and show gas wetness values up to 30%. Between 2340m-2964m MD RKB (Top Sele Fm to Top Cromer Knoll Fm) there are low gas abundances but high gas wetness values ranging between 30-90%. This section most probably represents low concentrations of migrated hydrocarbons. Between 2964m-3090m MD RKB (Top Cromer Knoll Fm to Top Brent Gp) there are high concentrations of gas, showing high gas wetness values (60-90%). This section represents the Upper Jurassic Draupne and Heather Fm shales, which at 3000m are probably generating small amounts of gas and this is shown in the data. From 2940m-3200m MD RKB (Brent Gp) gas abundances decrease whilst the gas wetness values remain high (80-90%), showing these are probably thermally generated hydrocarbons, most likely migrated and not in-situ generated from the Upper Jurassic shales above based on interpretations from the molecular data (see below).

The FIS data (Fluid Inclusion Stratigraphy) (Figure 1) indicate the presence of high abundances of methane below approximately 2150m MD RKB to TD, (Green Clay Fm to Drake Fm) but the most significant gas responses are documented below 3000m MD RKB (Top Heather Fm). Wet gas range petroleum species (to nC7) are identified in isolated samples, most notably at 3288m, 3291m, 3315m, 3414m, 3441m MD RKB (Lower Tarbert Fm to Ness Fm). Thin



sections from 10 samples taken in the most gas rich and wet gas areas showed no visible liquid petroleum inclusions or residual hydrocarbon staining. This indicates that no oil has migrated into the Brent Group sands. Proximal pay indicators (high acetic acid and benzene abundances) are noted between 3285m and 3291m MD RKB (Lower Tarbert Fm) indicating that sands down-dip maybe charged with oil. In summary, wet gas indicators are found at selected intervals from at the beginning of the Rogaland Gp (Balder Fm) to TD in the Dunlin Gp (Drake Fm).

3.8.3 Molecular Characterisation of Selected Samples

Detailed molecular geochemical characterisation was performed on 7 core samples and 1 mud sample taken just prior to coring. The mud sample contained low concentrations of n-alkanes, some two orders of magnitude lower than those present in the core samples. The mud sample n-alkane distribution shows an asymmetrical pattern ranging between nC12-nC24 with a maximum at nC16. Additionally, the mud sample contains hopane and sterane biomarkers, however these are found in very low concentrations. Although the mud sample contained both n-alkane and biomarker compounds their concentrations are sufficiently low not to affect the geochemical interpretations from the core samples. The core samples are characterised by n-alkane distributions ranging from nC14-nC27, with a maximum at nC19, a rapid increase and subsequent decrease in n-alkane abundances from nC14 to nC19, and nC19 to nC27 respectively, a significant unresolved complex mixture (UCM), and Pristine/Phytane ratios ranging between 0.52-0.78. These characteristics indicate that the hydrocarbons have undergone a period of biodegradation, as shown by the UCM and loss of nC14 to nC19, most likely mild biodegradation, removing only the low molecular weight n-alkanes (nC14 to nC19), but not strong enough to form anomalously high 25-norhopanes. The hopane mass chromatogram shows the predominance of tricyclic hopanes over extended hopanes, thought to be related to the high thermal maturity of the hydrocarbons. The sterane mass chromatogram shows high abundances of C27 steranes over C29 steranes, and C29 abb S and R isomers over C29 aaa S and R isomers, again showing the high thermal maturation of the hydrocarbons. It is thought that the hopane and sterane distributions are not a result of organic source facies but the high thermal maturation of the hydrocarbons.

3.8.4 Summary

- Oil shows are been identified from 2150m MD RKB to TD, with several zones showing high wet gas readings between 2964m-3200m, 3288m, 3291m, 3315m, 3414m, 3441m MD RKB. (Upper Jurassic, Draupne Fm to Drake Fm, Dunlin Gp).
- Hydrocarbons found in the Brent Group have been sourced from Upper Jurassic marine shales. The shales have been deposited in a reducing anoxic environment (either Heather or Draupne Fms).
- The hydrocarbons in the Brent Gp are thermally highly mature, probably late stage of oil generation.
- The hydrocarbons in the Brent Gp show signs of having been mildly biodegraded.



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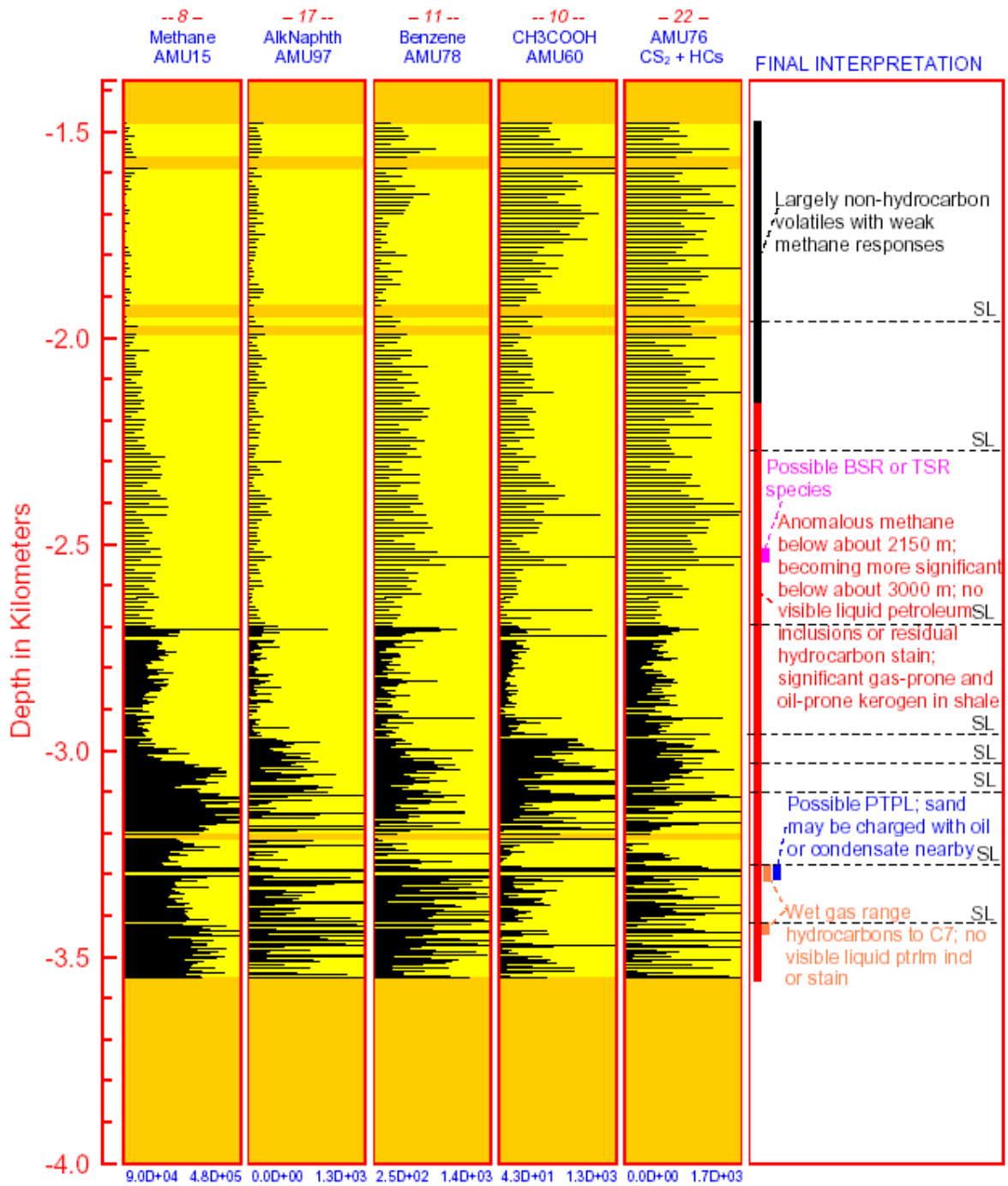


Figure 3.8-1. FIS Summary Tracks with interpretation



4 POST SITE SURVEY REPORT

The results are based on:

- 2D high-resolution reflection seismic (NH0382)
- 3D reflection seismic (SH9004)
- MWD logs (resistivity and gamma)
- Drilling results from exploration and production wells (30/9-16, 30/9-K-12 H, 30/11-1, 30/11-2, 30/11-3, 30/11-4 and 30/11-5 S).
- Site Survey at Planned Well Location 30/11-6, NH-00538901

4.1 Well data

- 1. Distance from rig floor to sea level:** 29m
- 2. Water depth (MSL):** 103.5m
- 3.a Setting depth for conductor (m RKB):** 229.5m
b Leak Off / Formation Integrity Test (g/cc): N/A
- 4.a Setting depth (m RKB TVD) for casing on which BOP mounted:** 1386.4m
b Formation Integrity Test (g/cc): 1.83 sg
- 5. Depth (m RKB TVD & Two Way Time) to formation/section/layer tops:**

R20:	145m	(156ms) *
R30:	189m	(203ms) *
R40:	236m	(252ms)
Base Pleistocene:	277m	(298ms)
R60:	434.5m	(452ms)
Base Pliocene:	574m	(580ms)
Base Utsira Fm:	749m	(760ms)

* The interval between seabed and 210m (RKB) was not logged. The depths are based on the Site Survey Report.

Note:

No chronostratigraphic information was collected in the top-hole section of the well (from seabed down to 1415m RKB MD). Consequently, the interpretation of the different formations in this area is based on the MWD logs, seismic character and previous work.

Mud logging commenced at 1415m RKB TVD.



6. Depth interval (m RKB TVD & Two Way Time) and age of sand bodies shallower than 1000m under the seabed. Note, which layers if any contain gas:

Pleistocene Interval

No log information above 229.5m
236m – 239.5m

Pliocene Interval

434.5m – 436m
438m – 444m
519m – 526m
539m – 546m
554m – 560m

Late Miocene (Utsira) Interval

574m – 721m
725m – 749m

Miocene Interval

762.5m – 799m
806m – 838m
843m – 880m
885m – 940.5m
950m – 985.5m

7 By what means is the presence of gas proven:

No data exists on background gas levels from seabed down to 1415m (section drilled with returns to seabed). However, no gas related incidents were reported when drilling this interval.

The well is drilled with returns to seabed above 1415m RKB m MD. Below 1415m RKB MD gas analyses were accomplished using flame ionisation detectors (FID) with gas measured as percentage methane (C1) equivalent in air, and chromatographic analyses expressed in parts per million.

8 Composition and origin of gas: N/A

9 Describe all measurements taken in gas bearing layers: N/A



4.2 Seismic data

- 10 Given depth and extent of any gas blanking ("gass-skygging"), seismic anomalies etc.:**

Seismic indications of gas have been mapped at several levels within the site survey area. The depth to each level and the closest approach to location are given below.

Level	Depth in metres (MSL)	Closest approach to location
1	160m	800m to NW
2	200m	160m to NE
3	278m	100m to N
	295m	140m to S
4	348m	360m to NNE
	328m to 373m	390m to ENE

Shallow gas was NOT expected at the Planned Well Location.

- 11 Note any indication of gas originating from deeper levels. Give description in cases where gas comes from deeper layers:**

N/A

- 12 How does the interpretation of the site survey correspond to the well data with respect to?**

a Shallow Gas:

No shallow gas was anticipated and no shallow gas was observed in the well.

b Sand Bodies:

The Pleistocene interval was not completely logged.
Thin Pliocene sands were anticipated without exact position. Thin sands were confirmed.
Miocene sands were predicted, but their exact position was not estimated.

c Boulders:

Boulders were predicted between 145m \pm 3m RKB and 235m \pm 11m RKB. However, no boulders were encountered.



d Unconformities (depths in metres RKB (TVD)):

Horizon	Prognosis, P (m) ^{*)}	Observation, O (m)	O-P (m)
Base Pleistocene	278m ± 31	277m	-1m (Shallower)
Base Pliocene	555m ± 36	574m	+19m (Deeper)
Base Utsira Fm (L.Mioc)	742m ± 45	749m	+7m (Deeper)

*) From Site Survey Report

The differences between the prognosed and observed depths to different formation tops were within the uncertainty limits. The difference between the predicted and observed depths at Base Pliocene is most likely due to pick uncertainty.

e Correlation to Nearby Wells:

The drilling conditions experienced in well 30/11-6 S are as predicted and similar to those encountered in tie-wells.



5 LISTING OF STANDARD AND SPECIAL STUDIES

- Hydro Oil and Gas, 2004 : Site survey at Planned Well Location 30/11-6 (NH0382),
Interpretation Report. No.: **NH-00538901**
- Hydro Oil and Gas, 2004 : Post Site Survey Report for Well 30/11-6S. No.: **NH-00861383**
- Hydro Oil and Gas, 2004 : Core description for Well 30/11-6 S. No.: **NH-00920394**
- Hydro Oil and Gas, 2004 : Petroleum Geochemistry of 30/11-6S. No.: **NH00921550**
- Hydro Oil and Gas, 2004 : Biostratigraphy of Well 30/11-6S. No.: **NH-00899230**
- GeoStrat, 2004 : Norsk Hydro 30/11-6S. Biostratigraphy of the Interval 1.480m-
3550m. Proj.No:04/857. No.: **NH -00899230**
- Fugro Survey as, 2004 : Navigation and Positioning of Deepsea Delta to 30/11-6S Brontes
for Norsk Hydro. Report No.7578. No.: **NH-00729744**
- Schlumberger, 2004 : VSP processing using the VSI tool, Well 30/11-6S. Ref. 00340.
No.: **NH-00923467**
- Schlumberger, 2004 : Modular Formation Dynamics Tester. Field Report. Well 30/11-6S.
No.: **NH-**
- Schlumberger, 2004 : Q-Borehole Report. Vertical Incidence VSP. 30/11-6S. Run 1A.
No.: **NH-**
- Baker Hughes, 2004 : End of Well Report, Directional Drilling, MWD and Surface
Logging. Well 30/11-6S. BHI Job ID: NOR1530. No.: **NH-**
- ResLab, 2004 : Conventional Core Analysis, Well 30/11-6S. Report No.: 10432-04.
No.: **NH -00831811**
- ResLab, 2004 : Digital Core Photos, White and UV light




6 ATTACHMENTS

1. Completion log. (30_11-6S_Completion_Plot.tiff). **NH-00924615**
2. Corelog 1-3. (30_11-6S_Corelog#1-3.tiff). **NH-00924593**
3. Site survey panel (Post Site Survey Log Panel 3011-6S.pdf). **NH-00920945**

SECTION B
DRILLING OPERATION SUMMARY
WELL 30/11-06 S

Prepared by:



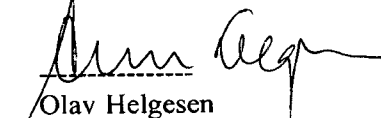
Sveinung Eldholm

Verified by:



Geir Skofteby

Approved by:



Olav Helgesen

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1. Operational Summary

1.1 Mobilization

The rig went off contract for Esso and on contract for Hydro 30 May 2004.

Planned AFE days:	2,14
Actual days:	1,98
Lost time:	0
Operation efficiency (OE = 1-(LT/AD)):	1

(OE = Operation Efficiency, LT = Lost Time, AD = Actual Days)

1.2 36" Section

Total depth of the section (hole depth): 229,6 m MD

Planned AFE days:	2,37
Actual days:	2,0
Lost time:	0
Operation efficiency:	1

1.2.1 Drilling

The well was spudded on the 1st of June 2004.

The 36" section was drilled with a 17 ½" x 36" hole opener from 132,5 m to 229,6 m (17 ½" down to 231 m). The BHA contained an MWD. The hole was drilled with seawater and pills of bentonite spud mud. The inclination of the section was kept below 1°.

1.2.2 Casing

The section was cased with 8 joints of 30" conductor casing to 228,4 m MD. The casing was cemented back to the seafloor with 44 m³ of 1,44 sg lead slurry and 25 m³ of 1,95 sg tail slurry.

1.3 17 ½" Section

Total depth of section:	1415 m MD
Planned AFE days:	5,66
Actual days:	5,42
Lost time:	2 hours (0,083 days)
Operation efficiency:	0,985

1.3.1 Drilling

The cement was tagged at 225 m MD and drilled out with a 26" clean out assembly to 231,5 m MD. POOH and changed to 17 ½" BHA. The BHA contained bit, motor, SRIG, MPR, MWD and DCP. The 17 ½" was drilled to 1415 m MD. The section was drilled with seawater and pills of bentonite spud mud (10 m³ every stand). Tight hole at 1388 m MD. Worked and lubricated the string. There was no resistance from 780 m MD. Ran in hole to TD for wiper trip. Reamed tight spot at 1145 m MD. At TD of section the hole was displaced with 1,3 sg bentonite mud. Spot 78 m³ glydril.

1.3.2 Casing

Ran 101 joints of 13 3/8" casing to 1408 m MD, 1386 TVD. The casing was cemented back to the seafloor with 164 m³ of 1,44 sg lead slurry and 22 m³ of 1,90 sg tail slurry.

1.4 12 ¼" Section

Total depth of section:	2700 m MD
Planned AFE days:	8,15
Actual days:	9,40
Lost time:	2 hours (0,083 days)
Operation efficiency:	0,991

1.4.1 Drilling

The cement was tagged at 1369 m MD. Drilled cement and displaced to glydril mud, 1,45 sg. The BHA contained bit, AutoTrak, and MWD. Performed a LOT to 1,83 sg at 1418 m MD and 1386 m TVD. Experienced some problems with stringers, and sliding in steering mode to drop angel. Drilled to 2413 m MD and POOH due to steering problems. Ran in hole with new BHA. Drilled from 2413 m MD to 2434 m MD. Experienced low penetration rate and POOH. Bit was balled up. RIH while reamed and washed tight spots at 1543m, 1870m, 2106m and 2220m MD. Drilled from 2434m MD to 2565 m MD. POOH because of difficulties with dropping angel and obtaining ROP. Bit was balled, but had no wear or other damages. Ran in hole with the same BHA. Routines were established to avoid bit balling. Reamed and drilled the hole from 2565 m MD to 2579 m MD. Oriented from 2579 m MD to 2611 m MD, and drilled to 2700 m MD TD.

1.4.2 Casing

Ran 206 joints of 9 5/8" casing to 2695 m MD, 2583 m TVD. The objective of the cementation was to cement the 9 5/8" casing with a TOC 200 m above the Shetland formation. The casing was cemented with 18,8 m³ of 1,80 sg tail slurry.

1.5 8 ½" Section

Total depth of section:	3550 m MD
Planned AFE days:	13,67
Actual days:	9,21
Lost time:	4 hours (0,167 days)
Operation efficiency:	0,982

1.5.1 Drilling

Tagged the casing float at 2655 m MD. Cleaned out the rathole and drilled 3 m new formation. Performed a LOT to 1,87 sg at 2703 m MD. Displaced the hole with new 1.45 sg glydril. Drilled to 3196 m MD and POOH. The BHA contained bit, AutoTrak, and MWD. Ran in hole with coring assembly and cored from 3196 m MD to 3300 m MD in 3 runs. Drilled from 3300m MD to TD at 3550m MD. Logged the formation in 3 runs. Log no. 1 contained SP – HRLA – PEX – MSIP – ECS, log no. 2 contained MDT and log no. 3 contained VSP.

1.6 Permanent abandonment

Planned AFE days:	6,39
Actual days:	5,13
Lost time:	5 hours (0,208 days)
Operation efficiency:	0,959

Set plug #1 with 11.4m³ of 1.92 SG slurry, to plug back from TD at 3285 m MD
 Set plug #2 with 11.4m³ of 1.92 SG slurry, to plug back from 3285 m MD to 3020 m MD
 Set plug #3 with 11.4m³ of 1.92 SG slurry, to plug back from 3020 m MD to 2780 m MD
 Set plug #4 with 8m³ of 1.80 SG slurry, to plug back from 2780 m MD to 2580 m MD

Tagged cement, firm cement at 2634 m MD. Load test plug with 10 ton. Pressure tested with equivalent of 70 bar over leak off pressure in 9 5/8" casing shoe.

Cut 9 5/8" casing at 403 m and POOH with casing cutting assembly. Made up wear bushing retrieving tool and wellhead wash tool. Ran in hole, latched wear bushing and pulled out and laid down wear bushing. Made up seal assembly retrieving tool. Ran in hole, engaged seal assembly and pulled out and laid down tools. Made up casing spear to pull 9 5/8" casing. Ran in hole and engaged casing. Pulled casing free, and pulled casing hanger to surface.

Set 13 3/8" bridge plug at 398 m. Verified plug set with 5 ton and pressure tested with 120 bars. Test pressure equivalent with 55 bars over leak-off at 13 3/8" shoe. Set cement plug from 398 m MD to 175 m MD with 17m³ of 2,0 sg slurry. Pulled BOP. Cut wellhead and verified with cut with 5 ton over pull. Pulled the wellhead and guide base to surface.

Rig off contract 02.07.2004 at 23:00

2 Experience

2.1 Well Design

Well 30/11-6 S was planned as an exploration well and has tested the Brontes prospect in PL035/PL272. Brontes is located in the eastern part of the block 30/11 and northeast of the Athene structure. The target of the well was the Brent delta sand of the Tarbert Formation.

The primary objectives were as follows:

- To drill through the Brent Gp. estimated to 3473 MD RKB
- Find hydrocarbon volume of economic interest in the Brent Gp. and establish the production potential
- Establish FWL/ODT
- Establish the overall reservoir thickness trend between 30/11-5 and 30/9-16, and investigate the reservoir quality in Tarbert 3 and Tarbert 2

Secondary objectives were as follows:

- Investigate the reservoir quality for the rest of the Brent Gp. incl. Tarbert 4 (Heather)
- Pressure data:
 - Verify that no pressure barrier is present within the reservoir in the Brent Gp.
 - Obtain pressure measurements for regional understanding
- Seismic tie

2.2 Operation

2.2.1 Experience reports

Nr 856: Repaired Casing tongs.

Description:

Casing tongs were rigged up incorrectly. Additional functions built into tongs and modem, have not been clearly marked, nor installed in logical sequence, for easy and unambiguous connections for control cables.

Recommendation:

Ensure that casing tongs have been clearly marked for easy rig-up, and that personnel are familiar with changes made to equipment.

Provide for complete rig up and function test in advance of actual job.

Nr 855: Plug and abandonment, Plugs, Cementing

Description:

Attempted to displace mud in the hole, unable to circulate. Pulled out with plug running tool and laid down. Ran back in with open-ended drill pipe to displace mud, and set cement plug.

The plan was to set cement plug on top of mechanical bridge plug, cementing through string and running tool used to set plug. This failed because the running tool was plugged after releasing from the plug.

The plug was set with hydraulic running tool, activated by drop ball. Setting procedure followed manual (and instructions from service rep). The running tool was released with back-up procedure, by unscrewing with right hand rotation. The reason was to avoid the shock when breaking free with 20-25 ton tension, and also to leave ball seat in plug which should leave largest opening for circulating and cementing through. Once circulation was attempted, the string was plugged. When pulled to surface, the ball seat w/ball was still attached to running tool.

Recommendation

Tool returned to vendor for further investigation. According to the design it should still have been possible to pump through running tool with ball and ball seat attached, but with smaller opening in tool.

2.3 Economy and budget

The total cost for the well is 2,3 % higher than budget. Reasons for increased cost were mainly due to increased personnel, consumables, transport and survey cost (survey cost was not considered in the AFE). However service cost were considerably lower than budget. The total increase of cost for the well was 2,2 million over budget.

The number of days used on the well was 33,14 while the budget was 38,4 days. Total downtime on the well was 13 hours (1,6%).

GENERAL INFORMATION ON WELL 30/11-6 S

Field : BRONTES **Country** : NORWAY
Licence : 272 **Installation** : DEEPSEA DELTA
UTM zone : 31 **Central Median** : 3' E **Horiz. Datum**: ED50

Location coordinates:		Surface	Target
UTM	North [m]:	6669338,4	6669348,9
UTM	East [m]:	479181,6	429820,6
Geographical	North :	60 09'32.53"	
Geographical	East :	02 37'29.92"	

Water Depth: 103,5 m **Reference Point Height:** 29,0 m
Formation at TD: DRAKE at 3550 m MD

Operators:	NORSK HYDRO PRODUKSJON A/S	Share:	50,00 %
Partners:	DET NORSKE OLJESELSKAP A/S	Share:	25,00 %
	SVENSKA PETROLEUM EXPLORATION A/S		25,00 %

Total depth (RKB) : 3550,0 m MD 3435,7 m TVD

TIME SUMMARY
Start Time : 2004-05-30 02:00:00
Spudding date : 2004-06-01
Abandonment date : 2004-07-02

Main operation	Hours	Days	%
MOBILIZATION	74,0	3,1	9,3
DRILLING	480,5	20,0	60,4
FORMATION EVALUATION MWD	3,0	0,1	0,4
FORMATION EVALUATION LOGGING	48,0	2,0	6,0
FORMATION EVALUATION CORING	84,0	3,5	10,6
SUBSEA STRUCTURE	1,0	0,0	0,1
PLUG AND ABANDONMENT	91,5	3,8	11,5
DOWNTIME DRILLING	6,0	0,3	0,8
DOWNTIME FORM. EVAL. CORING	2,0	0,1	0,3
DOWNTIME PLUG AND ABANDONMENT	5,0	0,2	0,6
Sum:	795,0	33,1	

Hole and casing record

Hole	Track	Depth [m MD]	Casing/Tubing	Track	Depth [m MD]
36"		229,5	30"		228,4
17 1/2"		1415,0	13 3/8"		1408,1
12 1/4"		2700,0	9 5/8"		2694,5
8 1/2"		3550,0			

Well status: Permanently abandoned Exploration Well

CONTRACTORS:

Bit Supplier : SMITH INTERNATIONAL A/S
Casing Equipment Supplier : MITSUI
Cement Contractor : SCHLUMBERGER CEMENT
Centralizer Supplier : WEATHERFORD NORGE A/S
Completion Eq. Contractor : HALLIBURTON OILFIELD SERVICES NORWAY II
Completion Eq. Contractor : ROXAR
Directional Drilling Contractor : BAKER HUGHES INTEQ
Liner Hanger Equipment Supplier : BAKER OIL TOOLS
Mud Contractor : MI NORGE
Other Supplier : KVÆRNER OILFIELD PRODUCTS
Other Supplier : SCHLUMBERGER WIRELINE & TESTING
Other Supplier : WEIR HOUSTON

GENERAL INFORMATION ON WELL 30/11-6 S

CONTRACTORS:

Rig Contractor :

ODFJELL DRILLING BERGEN A/S

DAILY REPORT ON WELL 30/11-6 S PO: 1

Daily report no : 1 **Date:** 2004-05-30
Midnight depth : 0 m MD **Estimated PP:** sg **Mud weight:** 0.00 sg

Stop time	Description
02:00	Rig on contract for Esso
15:00	Took over rig from Esso at last anchor up.
23:59	

Daily report no : 2 **Date:** 2004-05-31
Midnight depth : 0 m MD **Estimated PP:** sg **Mud weight:** 0.00 sg

Stop time	Description
23:59	Continued running anchors and deballasted the rig to drilling draft

Daily report no : 3 **Date:** 2004-06-01
Midnight depth : 0 m MD **Estimated PP:** sg **Mud weight:** 0.00 sg

Stop time	Description
01:30	Ballasting rig
05:00	Started drilling 17.5" x 36" hole from 132.4 meters to 160 meters. Pumped hi-vis pill and ran survey every 10 meters. Observed 1.82 degree inclination at 160 meters.
06:00	Remed stand several times. Inclination dropped to 1.36 degrees.
09:00	Drilling 17.5" x 36" hole from 160 meters to 175 meters. Pumped hi-vis pill every 10 meters. Last survey 1.36 degrees at 157 meters.
09:30	Move rig 2 m south east.
20:30	Continue drilling 17.5" x 36" hole from 175 m to TD at 229.57 m. 36" hole corrected for middle tide. Survey at TD 0.92 degrees at 220m.
21:30	Pumped 15 m3 hivis pill. Total 6000 strokes. Displaced hole to 1.50 sg mud.
22:00	Perform wipertrip to seabed.
22:30	Displace hole to 1.50 sg mud. POOH to seabed.
23:30	ROV installation of marking boyes.
23:59	POOH and rack BHA

Daily report no : 4 **Date:** 2004-06-02
Midnight depth : 0 m MD **Estimated PP:** sg **Mud weight:** 0.00 sg

Stop time	Description
01:00	Rack back BHA.
02:00	Pick up 30" running tool and install 5 1/2" pup joint and 2 ea 5 1/2" HWDP.
03:00	Clear rig floor and pick up 6 ea 5" DP.
05:00	Change rails and install 30" handling equipment. Checked DDM for loose parts. Held prejob meeting.
06:30	R/H with 30" conductor.
07:00	Picked up housing joint and held prejob meeting prior to running innerstring.
08:30	Install hydraulic elevator and pick up running tool stand and run and land casing in PGB. Release running tool and R/B stand.
09:30	R/H with cement slinger and made up running tool. Lowered running tool and made up to PGB/housing.
10:00	Run in sea with PGB. Fill up casing with seawater.
11:30	Stab in well at 10:05 hours and filled pipe. Held prejob meeting prior to cement job.
13:30	Mix and pump cement. Displaced down same.
20:00	Wait on cement.
20:30	Pumped 5 m3 nutplug pill and circulated same out with 400 lpm. Total 3200 strokes.
22:00	POOH and laid down running tool and 7 x 5" DP and 2x
23:00	Remove split ring in rotary and install solid ring. Change to drilling rails and clear rig floor.
23:59	Laid down holeopener drilling assembly and MWD

Daily report no : 5 **Date:** 2004-06-03
Midnight depth : 278 m MD **Estimated PP:** 1.03 sg **Mud weight:** 1.00 sg

Stop time	Description
01:00	Laid out hole opener.
01:30	Make ready to pick up DP
07:30	Picked up DP for 17 1/2" section

DAILY REPORT ON WELL 30/11-6 S PO: 1

Daily report no : 5 **Date:** 2004-06-03
Midnight depth : 278 m MD **Estimated PP:** 1,03 sg **Mud weight:** 1,00 sg

Stop time	Description
09:00	Rack 13 3/8" cementing head
10:00	M/U 26" BHA
11:00	RIH to drill cmt plug.
11:30	Adjusted rig to stab into hole
12:00	Tagged cement at 225m
13:30	Drilled out cement to 231.5m
14:00	Reamed hole. Pumped 10m3 havis.and circulated clean
14:30	Pulled out of hole with 26" BHA. Bulls eye 1 degs
15:30	Laid out 26" BHA
16:30	Made up handling pup joint on 18 3/4" hanger running tool.
17:00	Waited on helicopter
17:30	Laid out 18 3/4" hanger assembly.
18:30	Picked up 17 1/2" BHA
19:30	Programmed MWD
20:30	Ran in hole to 210 m
21:00	Washed down last stand
22:00	Observed unstable pump pressure.Trouble shoot on surface systems.
23:59	Drilled 17 1/2" hole from 231 m to 278 m. Pumped 10 m3 hi-vis every stand..

Daily report no : 6 **Date:** 2004-06-04
Midnight depth : 1415 m MD **Estimated PP:** 1,03 sg **Mud weight:** 1,00 sg

Stop time	Description
08:00	Drilled 17 1/2" hole to 530m
08:30	Circulated at 530 m to clean hole prior to enter Utsira formation.
14:00	Drilled 17 1/2" hole from 530 m MDto 731m MD.
14:30	Circulated to clean hole.
21:30	Kicked of @779m. Drilled from 779 m to 965 m. Build angle to 5.05degs
22:30	Circulated to clean hole.
23:59	Drilled 17 1/2" hole from 965 m to 1023m. Angle 8 degs

Daily report no : 7 **Date:** 2004-06-05
Midnight depth : 1415 m MD **Estimated PP:** 1,03 sg **Mud weight:** 1,00 sg

Stop time	Description
15:00	Drilled 17 1/2" hole from 1023m to 1415m.
16:00	Circulated and cleaned hole at TD. Took check survey at TD
17:00	Displaced hole to 1.30sg mud.
21:30	POOH. Tight hole at 1388m. Work & lubricated string. Continued POOH. No resist from 780m.
22:30	RIH to TD for Wipertrip. Ream tight spot at 1145m.
23:59	Displace hole to 1.30sg Bentonite mud. Spot 78m3 Glydrill.

Daily report no : 8 **Date:** 2004-06-06
Midnight depth : 1415 m MD **Estimated PP:** 1,03 sg **Mud weight:** 1,30 sg

Stop time	Description
03:00	POOH from 1415m to 295m.
04:00	Found bolt on rigfloor. Investigated same.
05:00	Continued POOH from 295m to 130m. Washed WH w/3500 lpm
06:00	Racked back BHA
07:00	Dumped MWD memory.
07:30	Racked back motor stand
08:00	Changed balls
08:30	Held prejob meeting prior to casing job
10:00	Rigged up for running casing
10:30	P/U shoe joint.
11:30	Continued to run 13 3/8" casg. Bakerlocked shoetrack
13:00	Continued to run casing. Stabbed into wellhead @130m

DAILY REPORT ON WELL 30/11-6 S PO: 1

Daily report no : 8 **Date:** 2004-06-06
Midnight depth : 1415 m MD **Estimated PP:** 1,03 sg **Mud weight:** 1,30 sg

Stop time	Description
14:00	Run casing to 229m
20:30	Continued to run casing to 915m
21:00	Repaired hyd hose on catwalk trolley
23:59	Continued to run casing to 1078m. Changed collar on jt #16

Daily report no : 9 **Date:** 2004-06-07
Midnight depth : 1415 m MD **Estimated PP:** 1,03 sg **Mud weight:** 1,30 sg

Stop time	Description
02:30	Ran in the hole with the 13 3/8" casing from 1078 m to 1266 m.
04:00	Changed hydraulic elevator and picked up the casing hanger.
05:00	Ran in the hole with the casing on drill pipe and landed same in the well head.
05:30	Performed a 30 ton overpull test on the casing hanger and sat down all weight. Borke circulation in steps to 2000 lpm.
06:00	Pumped 20 m3 SW spacer with 2000 lpm and pressure tested the surface lines.
09:30	Released the bottom dart. Sheared the bottom dart with 800 l. Mixed and pumped 164 m3 1.44 sg lead cement with 1100 lpm. Mixed and pumped 22 m3 1.90 sg tail cement. Released the top dart.
11:00	Displaced the cement with SW to drill floor (500 l) and sheared the top dart after 900 l. Displaced the cement with 2000 lpm. The top dart bumped at 5625 strokes. Pressure tested the casing with 120 bar / 10 min.
13:00	Released the wellhead running tool with 3 turns CW and washed the well head with 4300 lpm. Pulled out of the hole with the landing string and layed down the running tool. Rigged down the casing running equipment.
14:30	Rigged up to run BOP, held pre job meeting with the crew.
19:00	Picked up 2 X riser joints and skidded the BOP under rotary. Dressed the BOP. Pressure tested the kill and choke line with 35 / 345 bar, 5 / 10 min.
23:59	Held pre job meeting with the night crew. Ran the BOP to 124 m. Tested the kill and choke lines with 35 / 345 bar, 5 / 10 min. at 93 m.

Daily report no : 10 **Date:** 2004-06-08
Midnight depth : 1415 m MD **Estimated PP:** 1,03 sg **Mud weight:** 1,44 sg

Stop time	Description
02:30	Continued running the BOP from 124 m to the top of the guide posts.
03:00	Moved the rig in position over the well and stabbed the guide line anchors with the ROV.
04:00	Landed the BOP on the well head and attempted to latch the wellhead connector. Set the BOP connector in unlatch and sat down 25 ton on the wellhead. Functioned the BOP connector to latch and observed the movement with the ROV. Performed a 20 ton overpull test on the BOP.
05:30	Installed the RBQ plates and pressure tested the wellhead connector to 120 bar / 10 min. Layed out the riser landing joint.
06:00	Picked up the diverter from deck and rigged down the riser handling equipment.
11:30	Layed down the cement stand, 17 1/2" bit and motor. Made up 8" non mag drill collars and 12 1/8" none mag string stab. Prepared hang off tool with X-Over and handling pup.
13:30	Picked up motor with 12 1/4" bit. Ran in the hole with same. Held a pre job meeting with the crew.
16:00	Picked up 42 joints 5 1/2" drill pipe and racked 14 stands in the derrick.
18:30	Picked up single 5 1/2" drill pipe joints while running in the hole from 10 m to 640 m.
19:00	Function tested the BOP from the drillfloor and the tool pushers office, blue and yellow pods.
22:00	Continued running in the hole from 640 m to 1252 m while picking up singles from deck.
23:00	Filled up the pipe and broke circulation. Circulated with 3000 lpm, 16 bar and tested the MWD. Continued running in the hole from 1252 m to 1364 m. Installed the depth line.
23:59	Washed down from 1364 m and tagged the cement at 1369 m. Pulled off bottom and circulated with 2500 lpm, 69 bar.

Daily report no : 11 **Date:** 2004-06-09
Midnight depth : 1944 m MD **Estimated PP:** 1,20 sg **Mud weight:** 1,45 sg

Stop time	Description
03:00	Performed a Choke drill. Drilled cement and float from 1369 m to 1412 m. Broke through the 13 3/8" shoe at 1406 m. Reamed the shoe area several times. Pumped bentonite pills to clean the hole.
04:00	Held a pre job meeting with the crew and displaced the hole, kill and choke lines with 1.45 sg Glydrill Mud.
05:00	Cleaned out the rat hole from 1412 m to 1415 m and drilled 3 m new formation.
06:30	Performed a LOT to 1.83 sg.
18:30	Drilled the 12 1/4" hole from 1418 m to 1805 m.
19:30	Circulated bottoms up while attempting to restart the resistivity sensors in the MWD.
23:59	Continued drilling the 12 1/4" hole from 1805 m to 1944 m.

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Daily report no : 12 **Date:** 2004-06-10
Midnight depth : 2372 m MD **Estimated PP:** 1,20 sg **Mud weight:** 1,45 sg

Stop time	Description
02:30	Continued drilling the 12 1/4" hole from 1944 m to 2004 m.
03:30	Flow checked for 10 min. and performed a wipertrip to 1855 m. Hole in good condition, pulled 5 stands and ran back to TD.
10:00	Continued drilling the 12 1/4" hole from 2004 m to 2262 m.
10:30	Circulated to clean the hole prior to orienting.
23:59	Drilled and oriented the 12 1/4" hole from 2262 m to 2372 m.

Daily report no : 13 **Date:** 2004-06-11
Midnight depth : 2413 m MD **Estimated PP:** 1,20 sg **Mud weight:** 1,45 sg

Stop time	Description
09:00	Continued drilling and orienting the 12 1/4" hole from 2372 m to 2413 m.
10:00	Circulated bottoms up prior to pulling out of the hole to check bit, steering problems.
10:30	Flow checked the well and pumped slug.
12:30	Pulled out of the hole from 2413 m to the 13 3/8" shoe at 1408 m.
14:00	Continued pulling out of the hole to the BHA at 96 m.
16:00	Pulled out of the hole with the bottom hole assembly. Layed down the MWD and MPR, 2 x string stabs and the bit.
17:00	Picked up new MWD, MPR and saver sub.
17:30	Loaded data into the MWD tool.
19:00	Broke off the sleeve stab on the mud motor. Sat the AKO angle to 1.2 degrees and set scribe line.
20:00	Ran in the hole with the BHA to 146 m.
21:30	Continued running in the hole with the BHA on drill pipe from 146 m to 1012 m. Broke circulation and tested the MWD tool.
22:00	Continued running in the hole to the 13 3/8" shoe at 1408 m.
22:30	Continued running in the hole from 1408 m to 1600 m. Took weight at 1600 m, 20 to 25 ton. Washed and worked the area.
23:59	Continued running in the hole from 1600 m to 1783 m. Washed down from 1783 m to 1793 m due to tight spots, 20 ton. Continued running in the hole from 1793 m to 2054 m.

Daily report no : 14 **Date:** 2004-06-12
Midnight depth : 2434 m MD **Estimated PP:** 1,20 sg **Mud weight:** 1,45 sg

Stop time	Description
00:30	Continued running in the hole from 2054 m to 2296 m. Took weight.
01:00	Reamed and logged from 2287 m to TD at 2413 m.
15:30	Sat tool face and oriented from 2413 m to 2434 m.
16:30	Due to low ROP, racked back one stand and flow checked the well. Pumped slug and pulled out of the hole to the 13 3/8" shoe at 1408 m.
20:30	Continued pulling out of the hole from 1408 m to the top of the BHA at 92 m. Held a pre job safety meeting with the crew prior to handling the BHA.
22:00	Pulled out of the hole with the BHA. Drained the motor and inspected the bit. The bit was balled up.
23:00	Broke off the bit and layed down the motor. Picked up the new motor and made up MWD.
23:59	Broke off the sleeve stab on the motor and made up the bit. Sat the AKO on the motor to 1.2 degrees and checked the scribe line.

Daily report no : 15 **Date:** 2004-06-13
Midnight depth : 2536 m MD **Estimated PP:** 1,20 sg **Mud weight:** 1,45 sg

Stop time	Description
01:00	Ran in the hole with the BHA to 146 m.
02:30	Continued running in the hole with the BHA from 146 m to 1388 m.
03:00	Filled the pipe and broke circulation. Tested the MWD.
04:30	Continued running in the hole from 1388 m to 1870 m. Took weight below the 13 3/8" shoe, reamed and washed the area. Tight spots at 1543 m and 1870 m.
06:00	Continued running in the hole from 1870 m to 2220 m. Tight spots at 2106 m and 2220 m.
08:00	Washed and reamed from 2220 m to 2434 m.
13:00	Drilled and oriented the 12 1/4" hole from 2434 m to 2490 m.
13:30	Shut down mud pump 1 and 2 due to high temperature in the transformer room. Meanwhile circulated with 1000 lpm, 43 bar, 40 rpm, 8 - 10 Kibs.
23:59	Continued drilling and orienting the 12 1/4" hole from 2490 m to 2534 m. Experienced increasing difficulty in dropping angle and obtaining ROP.

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Daily report no : 16 **Date:** 2004-06-14
Midnight depth : 2565 m MD **Estimated PP:** 1,30 sg **Mud weight:** 1,45 sg

Stop time	Description
01:00	Attempted to continue drilling and orienting, low ROP and difficult to drop angle. Decision made to pull out of the hole to check the bit.
04:00	Pumped slug and pulled out of the hole to the 13 3/8" shoe.
05:00	Pulled out of the hole from 1408 m to the top of the BHA at 146 m.
07:00	Pulled out of the hole with the BHA. Found the bit balled up. Cleaned the bit.
09:30	While servicing the top drive discussed further actions with town.
10:00	Ran in the hole with the 12 1/4" BHA to 110 m.
11:30	Ran in the hole from 110 m to 1388 m.
12:00	Slipped and cut the drilling line.
14:00	Continued running in the hole from 1388 m to 2518 m.
15:30	Reamed and washed from 2518 m to 2534 m.
22:30	Drilled and oriented the 12 1/4" hole from 2534 m to 2557 m.
23:30	Continued drilling from 2557 m to 2563 m, rotating with 3000 lpm due to one mud pump down.
23:59	Continued drilling with full flow from 2563 m to 2565 m.

Daily report no : 17 **Date:** 2004-06-15
Midnight depth : 2700 m MD **Estimated PP:** 1,30 sg **Mud weight:** 1,45 sg

Stop time	Description
03:00	Continued drilling from 2565 m to 2579 m rotating.
07:00	Oriented from 2579 m to 2611 m.
07:30	Washed out suction valve on mud pump # 1. Changed same while circulating and reciprocating the string.
16:00	Continued drilling the 12 1/4" hole from 2611 m to 2700 m, TD of this section.
20:30	Circulated and conditioned the mud prior to running 9 5/8" casing.
23:59	Pulled out of the hole from 2700 m to 723 m.

Daily report no : 18 **Date:** 2004-06-16
Midnight depth : 2700 m MD **Estimated PP:** 1,30 sg **Mud weight:** 1,45 sg

Stop time	Description
01:00	Pulled out of the hole from 723 m to the BHA at 140 m.
04:00	Pulled out of the hole with the BHA and broke the bit.
05:30	Retrieved the wear bushing.
06:30	Made up and racked the cement stand.
07:30	Rigged up the casing running equipment.
08:00	Held a pre job safety meeting with the crew prior to running casing.
18:00	Ran in the hole with the 9 5/8" casing to 1486 m.
23:59	Ran in the hole with the 9 5/8" casing from 1486 m to 2400 m.

Daily report no : 19 **Date:** 2004-06-17
Midnight depth : 2700 m MD **Estimated PP:** 1,05 sg **Mud weight:** 1,45 sg

Stop time	Description
01:30	Continued running in the hole with the 9 5/8" casing from 2400 m to 2560 m.
02:30	Picked up the casing hanger and ran in the hole to 15 m above the well head.
03:30	Made up the cement stand and washed down from 2680 m to 2696 m. Landed the casing hanger at 03:15.
05:00	Circulated one annulus volume prior to cementing the 9 5/8" casing. Tested the surface lines to 350 bar.
07:00	Pumped 10 m3 drill water, 8 m3 spacer, dropped bottom dart and pumped 18,8 m3 1,80 sg cement. Displaced the cement with the mud pumps with 1500 lpm, 32 - 55 bar. Bumped the plug at 6919 strokes.
08:00	Tested the 9 5/8" casing to 350 bar / 10 min. Bled off pressure and checked for back flow, ok.
08:30	Opened the flow by ports in the casing hanger running tool with 5 right hand turns. Pumped through the ports to clean the seal assembly sealing area in the wellhead. Pumped with 1600 lpm, 8 bar. Sat down 15 tons and energised the casing hanger seal assembly with 3 right hand turns.
09:00	Tested the seal assembly with 350 bar / 10 min.
09:30	Released the running tool. Pumped nut plug and circulated to clean the pipe after the cement job.
10:00	Pulled out of the hole with the landing string, broke and laid down the casing hanger running tool.
11:30	Cleared and cleaned the rig floor. Made up the wear bushing running tool and wear bushing. Ran in the hole and sat the wear bushing.
15:00	Tested the BOP. 35 bar / 5 min. 350 bar / 10 min.

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Daily report no : 19 **Date:** 2004-06-17
Midnight depth : 2700 m MD **Estimated PP:** 1,05 sg **Mud weight:** 1,45 sg

Stop time	Description
17:30	Function tested the BOP. Tested kill and choke lines, kelly cock on the top drive and the kelly hose to 35 bar / 5 min and 350 bar / 10 min. Pulled out of the hole with the BOP test tool and laid down same.
18:30	Inspected the derrick equipment for loose items.
20:30	Laid down 2 stands 5 1/2" drill pipe due to damaged threads, cement head, jar and 2 X 8" drill collars.
21:00	Picked up and checked installation of the FMC spider. OK.
23:00	Made up the 8 1/2" bottom hole assembly including the float sub.
23:30	Connected electrical jumper cable and tested the Auto Trak.
23:59	Continued running in the hole with the 8 1/2" bottom hole assembly to 43 m.

Daily report no : 20 **Date:** 2004-06-18
Midnight depth : 2721 m MD **Estimated PP:** 1,05 sg **Mud weight:** 1,45 sg

Stop time	Description
00:30	Continued running in the hole with the 8 1/2" bottom hole assembly from 43 m to 100 m.
03:00	Ran in the hole with the 8 1/2" bottom hole assembly picking 5" drill pipe singles from 100 m to 613 m.
04:00	Picked up one single drill pipe and landed in box on pipe in rotary. Unintentionally lowered the top drive down onto the pipe and consequently bent same. Laid out the bent drill pipe. Pulled out one single and laid out same.
05:00	Continued running in the hole picking up singles from deck to 905 m / 83 joints.
05:30	Made up X-Over and continued running in the hole on 5 1/2" drill pipe from 875 m to 992 m.
06:30	Changed saver sub on the top drive due to damaged threads.
09:30	Continued running in the hole from 992 m to 2640 m.
10:00	Filled the pipe and broke circulation. Washed down and tagged the casing float at 2655 m. Pulled above and closed the annular preventer in preparation for a choke drill.
11:00	Performed a choke drill and H2S drill.
11:30	Lubricated drilling equipment and changed air hose for high clutch.
16:00	Drilled through the casing float sub, shoe track and shoe at 2695 m. Cleaned out the rat hole to 2700 m and drilled 3 m new formation to 2703 m.
18:30	Circulated bottom up to clean the hole.
19:30	Performed a leak off test to 1.87 sg.
21:00	Displaced the hole with new 1.45 sg Glydrill mud.
21:30	Down linked to the Auto Trak and drilled the 8 1/2" hole from 2703 m to 2704 m.
22:30	Cleaned the shaker area and gumbo box. Changed shaker screens due to overflow.
23:59	Drilled the 8 1/2" hole from 2704 m to 2721 m.

Daily report no : 21 **Date:** 2004-06-19
Midnight depth : 3088 m MD **Estimated PP:** 1,20 sg **Mud weight:** 1,45 sg

Stop time	Description
20:00	Continued drilling and orienting the 8 1/2" hole from 2721 m to 3036 m.
21:00	Circulated bottoms up for sample.
23:59	Continued drilling from 3036 m to 3088 m.

Daily report no : 22 **Date:** 2004-06-20
Midnight depth : 3196 m MD **Estimated PP:** 1,20 sg **Mud weight:** 1,45 sg

Stop time	Description
00:30	Continued drilling from 3088 m to 3093 m.
01:00	Circulated bottoms up for sample.
07:00	Continued drilling from 3093 m to 3184 m.
07:30	Circulated bottoms up for sample.
08:30	Continued drilling from 3184 m to 3194 m.
09:00	Circulated bottoms up for sample.
09:30	Continued drilling from 3194 m to 3196 m.
10:00	Circulated the hole clean and flowchecked for 10 min. Well static.
13:30	Core point, pumped slug and pulled out of the hole to 1408 m.
14:30	Continued pulling out of the hole using rig tongs from 905 m due to overtorqued connections. Held pre job meeting prior to using rig tongs.
16:00	Continued pulling out of the hole from 905 m to 43 m.
17:00	Pulled out of the hole with the bottom hole assembly and broke off the bit.

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Daily report no : 22 **Date:** 2004-06-20
Midnight depth : 3196 m MD **Estimated PP:** 1,20 sg **Mud weight:** 1,45 sg

Stop time	Description
17:30	Checked demik equipment for loose items.
19:00	Changed wire on lower racking arm.
20:30	Held a safe job meeting with the crew prior to making up the coring assembly. Picked up the core assembly and made up the core head and inner barrels.
21:00	Ran in the hole with the core assembly to 105 m.
22:30	Ran in the hole with the coring assembly from 105 m to 911 m on 5" drill pipe and to 1408 m on 5 1/2" drill pipe.
23:59	Continued running in the hole from 1408 m to 2646 m.

Daily report no : 23 **Date:** 2004-06-21
Midnight depth : 3217 m MD **Estimated PP:** 1,20 sg **Mud weight:** 1,45 sg

Stop time	Description
01:00	Continued running in the hole with the coring assembly from 2646 m to TD at 3196 m.
02:00	Circulated bottoms up, dropped ball and prepared for coring.
04:00	Cored from 3196 m to 3215 m for a full core barrel.
12:30	Pulled out of the hole with the core.
14:00	Held pre-job meeting for corehandling. Recovered core, laid down inner barrel with core.
14:30	Serviced rig and cleaned drill floor.
18:00	Checked BHA and corehead. Made up new coring assembly for 55 m core length on BHA and ran in the hole.
21:00	Continued tripping in the hole with corebarrel.
22:00	Continued tripping in the hole to TD.
23:30	Circulated bottoms up and prepared for continued coring.
23:59	Cored from 3215m to 3217m.

Daily report no : 24 **Date:** 2004-06-22
Midnight depth : 3269 m MD **Estimated PP:** 1,20 sg **Mud weight:** 1,45 sg

Stop time	Description
04:30	Continued coring from 3217 m to 3269 m, full core barrel.
06:30	Pulled out of the hole with core.
13:00	Continued pulling out of the hole with core.
13:30	Pulled out, racked BHA and pulled core to surface.
16:00	Recovered core, laid down inner barrel with core.
18:00	Made up coring assembly, picked up new inner barrel and ran in with BHA.
18:30	Serviced rig, greased DDM and checked for loose items.
21:30	Continued running in the hole with core barrel.
22:30	Continued tripping in open hole to TD. Tagged bottom.
23:59	Circulated bottoms up, dropped ball, spaced out and prepared to cut core #3.

Daily report no : 25 **Date:** 2004-06-23
Midnight depth : 3300 m MD **Estimated PP:** 1,20 sg **Mud weight:** 1,45 sg

Stop time	Description
03:00	Cored from 3269m to 3300m. Core jammed.
04:00	Circulated and conditioned mud. Flow checked well and pumped slug..
05:00	Pulled out with core.
11:30	Continued pulling out with core.
13:00	Pulled out with BHA and core barrel.
14:30	Recovered and layed down core.
15:00	Serviced rig and checked DDM.
16:00	Made up Drilling BHA with new Bit, AutoTrack and MWD.
18:00	Continued running in the hole with 5" DP.
18:30	Damaged one joint of 5" DP. Layed out damaged joint and changed DDM saver sub.
21:30	Continued running in the hole with 5 1/2" DP.
22:30	Slipped and cut drill line.
23:30	Continued running in the hole to top of the cored interval.
23:59	Reamed and logged cored interval.

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Daily report no : 26 **Date:** 2004-06-24
Midnight depth : 3550 m MD **Estimated PP:** 1,14 sg **Mud weight:** 1,45 sg

Stop time	Description
02:30	Continued reaming and logging cored interval.
16:30	Drilled 8 1/2" hole from 3300m to TD at 3550m.
19:30	Circulated the hole clean and conditioned mud for logging.
21:00	Pulled out of open hole and into casing.
21:30	Function tested the BOP.
23:59	Continued pulling out of the hole.

Daily report no : 27 **Date:** 2004-06-25
Midnight depth : 3550 m MD **Estimated PP:** 1,14 sg **Mud weight:** 1,45 sg

Stop time	Description
01:30	Continued pulling out with drilling assembly.
02:00	Layed down AutoTrack BHA and Bit.
05:00	Rigged up wireline tools for logging.
07:00	Running in the hole with logging tools for Log #1.
09:30	Continued running into open hole to TD.
16:00	Logged out from TD to casing shoe. Log #1: SP/HLA/PEX/MSIP/ECS
21:30	Continued logging in cased hole with MSIP.
22:00	Pulled out of hole with logging tools.
23:59	Layed down logging tool, Log #1.

Daily report no : 28 **Date:** 2004-06-26
Midnight depth : 3550 m MD **Estimated PP:** 1,14 sg **Mud weight:** 1,45 sg

Stop time	Description
00:30	Finished laying down tools, Log #1.
03:00	Made up logging tools for Log #2, MDT.
04:00	Ran in the hole with MDT tool.
06:00	Ran in the hole with logging tools to first/deepest pressure point.
15:00	Logged MDT from 3500m to 3100m, with 25 pressure points.
16:30	Pulled out of the hole with MDT tool.
17:30	Layed down MDT tools.
18:30	Made up toolstring for Log #3, VSP.
19:30	Ran in the hole with VSP tools.
23:59	Ran in hole to TD and performed VSP survey from TD to 1400m.

Daily report no : 29 **Date:** 2004-06-27
Midnight depth : 3550 m MD **Estimated PP:** 1,14 sg **Mud weight:** 1,48 sg

Stop time	Description
00:30	Pulled out of hole with VSP tools, and layed down tools.
02:00	Rigged down wireline tools and cleared drill floor.
04:30	Made up 3 1/2" DP cement stinger with diverter sub.
06:30	Ran in the hole with cement stinger to set cement plugs in open hole.
07:00	Found two small bolts on drill floor. Checked equipment in derrick for potential loose parts.
08:30	Continued running in the hole with cement stinger.
09:30	Continued running in the hole with cement stinger to TD.
11:30	Circulated and conditioned mud before cementing.
12:00	Made up cement stand in the string. Pressure tested lines.
13:30	Set plug #1 with 11.4 m3 of 1.92sg cement slurry, to plug back from TD to 3285m.
14:00	Unable to break connection and unscrew DDM from cement stand.
14:30	Racked back the cement stand. Pulled out of the hole to 3285m, expected top of cement plug.
16:30	Circulated out spacer and excess cement.
17:00	Made up cement stand in the string. Pressure tested lines.
18:30	Set plug #2 with 11.4 m3 of 1.92sg cement slurry, to plug back from 3285m to 3020m.
19:00	Racked back the cement stand. Pulled out of the hole to 3020m, expected top of cement.
20:30	Circulated out spacer and excess cement.
21:00	Made up cement stand in the string. Pressure tested lines.

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Daily report no : 29 **Date:** 2004-06-27
Midnight depth : 3550 m MD **Estimated PP:** 1,14 sg **Mud weight:** 1,48 sg

Stop time	Description
22:30	Set plug #3 with 11,4 m3 of 1,92sg cement slurry, to plug back from 3020m to 2780m.
23:00	Racked back the cement stand. Pulled out of the hole to 2780m, expected top of cement.
23:59	Circulated out spacer and excess cement.

Daily report no : 30 **Date:** 2004-06-28
Midnight depth : 3550 m MD **Estimated PP:** 1,14 sg **Mud weight:** 1,45 sg

Stop time	Description
00:30	Circulated out spacer and excess cement.
01:00	Made up cement stand in the string. Pressure tested lines.
02:00	Set plug #4 with 8 m3 of 1,80sg cement slurry, to plug back from 2780m to 2580m.
02:30	Racked back the cement stand. Pulled out of the hole to 2580m, expected top of cement.
04:00	Circulated out spacer and excess cement.
06:30	Pulled out of hole with DP and cement stinger.
10:00	Changed to 5" handling tools and continued pulling out of the hole, laying down 5" DP to pipe deck.
10:30	Pulled out with 3 1/2" cement stinger and racked in derrick. Laid down diverter sub.
11:00	Serviced rig and inspected equipment in derrick for loose objects.
12:30	Laid down corebarrel from derrick.
13:30	Made up 8 1/2" bit and BHA to locate and test cement plug. Ran in the hole with 5" DP.
14:00	Changed to 5 1/2" handling tools and continued tripping in with 5 1/2" DP.
14:30	Changed out damaged joint in cement stand.
16:00	Continued tripping in the hole to locate cement plug.
17:30	Washed and reamed while running in the hole. Tagged cement plug, firm cement at 2634m. Load tested plug with 10 Ton.
18:00	Pressure tested cement plug with the equivalent of 70 bar over leak off pressure at 9 5/8" casing shoe.
21:30	Pulled out of the hole with 8 1/2" Bit & BHA.
22:00	Laid down 8 1/2" BHA.
23:59	Made up 9 5/8" Casing Cutting BHA and ran in hole.

Daily report no : 31 **Date:** 2004-06-29
Midnight depth : 3550 m MD **Estimated PP:** 1,14 sg **Mud weight:** 1,47 sg

Stop time	Description
01:30	Continued making up casing cutting assembly. Spaced out and made up swivel assembly. Ran in and landed marine swivel in wellhead with cutters positioned for cut at 403m.
02:00	Cut casing with mechanical cutter.
02:30	Checked for flow, circulated bottoms up through K/C lines, then open BOP and observed hole on trip tank. Circulated bottoms up through riser. Flow checked, hole static.
05:30	Pulled out with casing cutting assembly.
08:00	Made up wear bushing retrieving tool and wellhead wash tool. Ran in hole, latched wear bushing and pulled out and laid down wear bushing.
09:30	Made up seal assembly retrieving tool. Ran in hole, engaged seal assembly and pulled out and laid down tools.
13:30	Made up casing spear to pull 9 5/8" casing. Ran in and engaged casing. Pulled casing free, and pulled casing hanger to surface. Released and laid down spear.
14:30	Rigged up casing handling tools for pulling the cut 9 5/8" casing.
15:00	Repaired Casing tongs.
17:00	Pulled out and laid down casing hanger and casing.
18:00	Rigged down casing handling tools.
20:30	Made up mechanical bridge plug with running tool and ran in the hole on drillpipe to setting depth at 398m. Set plug and pressure tested with 120 Bar.
23:30	Attempted to displace mud in the hole, unable to circulate. Pulled out with plug running tool and laid down. Ran back in with open ended DP to displace mud, and set cement plug.
23:59	Displaced mud in the hole with seawater.

Daily report no : 32 **Date:** 2004-06-30
Midnight depth : 3550 m MD **Estimated PP:** 1,14 sg **Mud weight:** 1,47 sg

Stop time	Description
01:30	Set cement plug on top of Bridge Plug from 398 m to 175 m with 17 m3 of 2,0 sg cement slurry.

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Daily report no : 32 **Date:** 2004-06-30
Midnight depth : 3550 m MD **Estimated PP:** 1,14 sg **Mud weight:** 1,47 sg

Stop time	Description
03:00	Pulled out of the hole with cement string.
04:30	Made up jet washing tool on DP and ran in the hole to wash and clean BOP and Riser.
06:00	Rig up handling tools and prepare for pulling the Riser & BOP.
07:00	Pulled diverter and laid down.
07:30	Installed hydraulic Riser running tool.
08:00	Held prejob meeting before releasing and pulling BOP.
09:00	Released BOP, pulled up and laid out slip joint.
10:00	Disconnected K/C lines and pod saddles.
13:00	Pulled BOP to surface and landed on BOP transporter.
14:00	Disconnected riser from BOP. Laid down remaining riser joints.
15:30	Rigged down riser and BOP handling tools.
16:00	Laid down BHA used to pull 9 5/8" casing.
18:00	Made up BHA for cutting and retrieving of wellhead.
18:30	Ran in with wellhead cutting assembly. Landed tools in wellhead and prepared to cut.
23:00	Cut wellhead by cutting through 20" and 30" casings. Cut made at 137 m RKB / Seabed 132 m RKB
23:59	Pulled wellhead and guide base free. Disconnected and pulled guide wires.

Daily report no : 33 **Date:** 2004-07-01
Midnight depth : 3550 m MD **Estimated PP:** 1,14 sg **Mud weight:** 1,47 sg

Stop time	Description
01:30	Pulled wellhead and guidebase to surface, landed and secured on carrier in moon pool.
02:30	Disconnected wellhead from guide base, pulled up and landed in rotary table. Laid out wellhead cutting and retrieving assembly. Laid down wellhead on deck.
04:00	Laid down DP and tools from derrick and prepared for rig move. Moved Guide base from moonpool to pipe deck and secured.
07:00	Deballasted rig.
09:30	Stopped deballasting and unloaded cargo from one anchor handler. Had all anchor handlers come alongside to receive pennant wire and navigational packages.
14:00	Continued de-ballasting rig to transit draft.
23:59	Pulled anchors.

Daily report no : 34 **Date:** 2004-07-02
Midnight depth : 3550 m MD **Estimated PP:** 1,14 sg **Mud weight:** 1,47 sg

Stop time	Description
05:00	Continued pulling anchors.
23:59	No activity on Brontes. Rig departed location and in transit to new location.

Norsk Hydro

2004-12-23

HOLE DEVIATION

Well: 30/11-6 S Reference point: RKB ; 29.0 m ABOVE MSL
 Waterdepth: 103,5 m Vertical to: 132,4 m Total Depth: 3550,0 m MD
 Utm zone: 31 Central Median: 3'E Horizontal datum: ED50
 Template Centre Coordinates, UTM: North : m, East : m
 Wellhead Coordinates, UTM: North : 6669336,40 m, East : 479181,60 m
 Official Surveys: Y Track :
 Coordinates are measured from the wellhead centre.

Depth MD [m]	Inclination [Deg]	Direction [Deg]	Tool Type	#	Depth TVD [m]	Coordinates		Vert. Sect [m]	Dogleg [D/30m]	Build [D/30m]	Turn [D/30m]
						North [m]	East [m]				
133.50	0,00	0,00	MWD	1	133.50	0,00	0,00	0,00	0,00	0,00	0,00
144.30	1,35	126,92	MWD	1	144.30	-0,08	0,10	0,13	3,75	3,75	352,56
168.30	0,30	106,74	MWD	1	168.30	-0,26	0,39	0,47	1,34	-1,31	-25,23
196.40	0,90	134,81	MWD	1	196.39	-0,44	0,61	0,76	0,69	0,64	29,97
220.30	0,92	133,01	MWD	1	220.29	-0,70	0,89	1,13	0,04	0,03	-2,26
244.30	1,78	132,23	MWD	1	244.28	-1,09	1,31	1,70	1,08	1,08	-0,98
274.60	2,03	133,99	MWD	1	274.57	-1,78	2,04	2,70	0,25	0,25	1,74
303.70	2,44	137,40	MWD	1	303.65	-2,59	2,83	3,84	0,44	0,42	3,52
332.80	1,54	130,23	MWD	1	332.73	-3,30	3,55	4,84	0,96	-0,93	-7,39
361.50	1,07	103,56	MWD	1	361.42	-3,61	4,10	5,46	0,79	-0,49	-27,88
390.50	1,04	121,14	MWD	1	390.42	-3,81	4,59	5,97	0,33	-0,03	-18,19
419.30	1,26	107,66	MWD	1	419.21	-4,04	5,12	6,52	0,36	0,23	-14,04
446.50	1,62	113,26	MWD	1	446.40	-4,28	5,75	7,17	0,43	0,40	6,18
475.80	1,67	114,79	MWD	1	475.69	-4,63	6,62	8,00	0,07	0,05	1,57
504.90	1,66	112,31	MWD	1	504.78	-4,96	7,30	8,83	0,07	-0,01	-2,56
533.20	1,65	122,52	MWD	1	533.07	-5,34	8,02	9,63	0,31	-0,01	10,82
590.50	0,73	91,53	MWD	1	590.35	-5,79	9,08	10,77	0,57	-0,48	-16,23
617.50	0,57	116,17	MWD	1	617.35	-5,86	9,37	11,05	0,35	-0,18	27,38
678.20	0,31	321,95	MWD	1	678.05	-5,86	9,54	11,20	0,42	-0,13	-76,22
705.50	0,50	66,57	MWD	1	705.35	-5,75	9,61	11,20	0,72	0,21	114,97
737.20	0,26	132,70	MWD	1	737.05	-5,75	9,79	11,35	0,44	-0,23	62,58
765.40	0,24	53,49	MWD	1	765.25	-5,76	9,88	11,44	0,34	-0,02	-84,27
794.50	0,23	73,26	MWD	1	794.35	-5,70	9,99	11,50	0,08	-0,01	20,38
824.40	0,56	73,81	MWD	1	824.25	-5,64	10,18	11,64	0,33	0,33	0,55
854.20	0,97	80,32	MWD	1	854.05	-5,56	10,57	11,95	0,42	0,41	6,55
882.80	1,71	90,73	MWD	1	882.64	-5,53	11,24	12,52	0,81	0,78	10,92
911.60	2,79	86,95	MWD	1	911.41	-5,49	12,37	13,53	1,13	1,13	-3,94
940.90	3,75	89,36	MWD	1	940.67	-5,45	14,04	15,06	0,99	0,98	2,47
968.10	5,05	92,42	MWD	1	967.79	-5,49	16,12	17,03	1,46	1,43	3,38
996.90	7,14	91,19	MWD	1	996.42	-5,58	19,18	19,97	2,18	2,18	-1,28
1025.90	8,00	91,50	MWD	1	1025.17	-5,67	23,00	23,69	0,89	0,89	0,32
1055.60	9,32	94,93	MWD	1	1054.53	-5,93	27,46	28,09	1,43	1,33	3,46
1080.60	11,76	91,35	MWD	1	1079.11	-6,16	32,03	32,61	3,03	2,93	-4,30
1114.70	11,95	93,46	MWD	1	1112.48	-6,46	39,02	39,55	0,42	0,17	1,86
1143.70	14,06	91,12	MWD	1	1140.73	-6,71	45,54	46,03	2,25	2,18	-2,42
1171.90	17,07	88,28	MWD	1	1167.90	-6,65	53,11	53,52	3,30	3,20	-3,02

Norsk Hydro

2004-12-23

HOLE DEVIATION

Well: 30/11-6 S Reference point: RKB ; 29,0 m ABOVE MSL
 Waterdepth: 103,5 m Vertical to: 132,4 m Total Depth: 3550,0 m MD
 Utm zone: 31 Central Median: 3' E Horizontal datum: ED50
 Template Centre Coordinates, UTM: North : m, East : m
 Wellhead Coordinates, UTM: North : 6669338,40 m, East : 479181,60 m
 Official Surveys: Y Track :
 Coordinates are measured from the wellhead centre.

Depth MD [m]	Inclination [Deg]	Direction [Deg]	Tool Type	#	Depth TVD [m]	Coordinates		Vert. Sect [m]	Dogleg [D/30m]	Build [D/30m]	Turn [D/30m]
						North [m]	East [m]				
1200,80	18,72	85,09	MWD	1	1195,40	-6,13	61,97	62,27	1,99	1,71	-3,31
1230,30	19,67	86,53	MWD	1	1223,26	-5,42	71,64	71,85	1,08	0,97	1,46
1259,00	21,93	86,48	MWD	1	1250,09	-4,80	81,81	81,95	2,36	2,36	-0,05
1288,40	23,70	86,71	MWD	1	1277,18	-4,12	93,19	93,28	1,81	1,81	0,23
1318,00	24,08	86,76	MWD	1	1304,25	-3,44	105,16	105,22	0,39	0,39	0,05
1345,40	24,07	87,32	MWD	1	1329,27	-2,86	116,32	116,36	0,25	-0,01	0,61
1374,60	24,52	86,76	MWD	1	1355,88	-2,24	128,32	128,34	0,52	0,46	-0,58
1391,20	24,51	87,32	MWD	1	1370,98	-1,89	135,20	135,21	0,42	-0,02	1,01
1429,10	24,57	87,24	MWD	1	1405,46	-1,14	150,92	150,93	0,05	0,05	-0,06
1456,90	24,39	87,33	MWD	1	1430,76	-0,59	162,43	162,43	0,20	-0,19	0,10
1487,30	24,44	86,98	MWD	1	1458,44	0,03	174,98	174,98	0,15	0,05	-0,35
1516,70	24,36	87,01	MWD	1	1485,22	0,67	187,11	187,11	0,08	-0,08	0,03
1545,90	24,50	86,65	MWD	1	1511,80	1,34	199,17	199,17	0,21	0,14	-0,37
1574,10	24,33	86,66	MWD	1	1537,48	2,02	210,80	210,81	0,18	-0,18	0,01
1632,60	24,15	87,44	MWD	1	1590,82	3,25	234,79	234,81	0,19	-0,09	0,40
1660,60	24,05	87,48	MWD	1	1616,38	3,76	246,21	246,24	0,11	-0,11	0,04
1688,80	23,98	87,32	MWD	1	1642,14	4,28	257,67	257,71	0,10	-0,07	-0,17
1717,60	23,76	87,20	MWD	1	1668,48	4,84	269,32	269,36	0,23	-0,23	-0,13
1747,20	23,64	87,03	MWD	1	1695,58	5,44	281,20	281,25	0,14	-0,12	-0,17
1776,40	23,58	87,11	MWD	1	1722,34	6,03	292,88	292,94	0,07	-0,06	0,08
1810,50	23,44	87,37	MWD	1	1753,61	6,69	306,46	306,54	0,15	-0,12	0,23
1835,00	23,35	87,33	MWD	1	1776,09	7,14	316,18	316,26	0,11	-0,11	-0,05
1863,70	23,24	87,35	MWD	1	1802,45	7,66	327,52	327,61	0,11	-0,11	0,02
1890,80	23,10	87,73	MWD	1	1827,37	8,12	338,17	338,27	0,23	-0,15	0,42
1921,50	23,17	88,33	MWD	1	1855,60	8,54	350,23	350,33	0,24	0,07	0,59
1950,00	23,16	87,87	MWD	1	1881,80	8,91	361,43	361,54	0,19	-0,01	-0,48
1979,30	23,19	87,69	MWD	1	1908,74	9,36	372,95	373,07	0,08	0,03	-0,18
2008,10	23,24	87,74	MWD	1	1935,20	9,81	384,30	384,42	0,06	0,05	0,05
2037,30	23,36	87,65	MWD	1	1962,02	10,27	395,84	395,97	0,13	0,12	-0,09
2065,20	23,36	88,03	MWD	1	1987,64	10,69	406,89	407,03	0,16	0,00	0,41
2094,40	23,24	87,87	MWD	1	2014,45	11,10	418,44	418,58	0,14	-0,12	-0,16
2122,30	22,99	88,11	MWD	1	2040,11	11,49	429,38	429,54	0,29	-0,27	0,26
2151,60	23,13	87,88	MWD	1	2067,07	11,89	440,85	441,01	0,17	0,14	-0,24
2180,20	23,14	88,07	MWD	1	2093,37	12,29	452,08	452,25	0,08	0,01	0,20
2207,80	22,94	88,03	MWD	1	2118,77	12,65	462,88	463,05	0,22	-0,22	-0,04
2238,90	22,77	88,45	MWD	1	2147,43	13,02	474,95	475,13	0,23	-0,16	0,41

Norsk Hydro

2004-12-23

HOLE DEVIATION

Well: 30/11-6 S Reference point: RKB ; 29.0 m ABOVE MSL
 Waterdepth: 103,5 m Vertical to: 132,4 m Total Depth: 3550,0 m MD
 Utm zone: 31 Central Median: 3° E Horizontal datum: ED50
 Template Centre Coordinates, UTM: North : m, East : m
 Wellhead Coordinates, UTM: North : 6669338,40 m, East : 479181,60 m
 Official Surveys: Y Track :
 Coordinates are measured from the wellhead centre.

Depth MD [m]	Inclination [Deg]	Direction [Deg]	Tool Type	#	Depth TVD [m]	Coordinates		Vert. Sect [m]	Dogleg [D/30m]	Build [D/30m]	Turn [D/30m]
						North [m]	East [m]				
2267.20	22,05	89,04	MWD	1	2173,59	13,26	485,74	485,92	0,80	-0,76	0,63
2297.90	21,31	89,24	MWD	1	2202,12	13,43	497,08	497,26	0,73	-0,72	0,20
2326.60	20,52	88,40	MWD	1	2228,93	13,64	507,32	507,50	0,88	-0,83	-0,88
2356.30	19,88	89,36	MWD	1	2256,80	13,84	517,57	517,76	0,73	-0,65	0,97
2386.30	19,43	89,67	MWD	1	2285,05	13,93	527,66	527,85	0,46	-0,45	0,31
2412.50	18,57	90,00	MWD	1	2309,83	13,95	536,19	536,37	0,99	-0,98	0,38
2440.90	16,73	93,19	MWD	1	2336,89	13,73	544,80	544,97	2,20	-1,94	3,37
2469.60	14,73	91,91	MWD	1	2364,51	13,38	552,57	552,73	2,12	-2,09	-1,34
2498.60	14,19	91,54	MWD	1	2392,59	13,16	559,81	559,96	0,57	-0,56	-0,38
2516.30	14,08	90,51	MWD	1	2409,76	13,08	564,13	564,28	0,47	-0,19	-1,75
2529.00	13,69	91,09	MWD	1	2422,09	13,04	567,18	567,33	0,98	-0,92	1,37
2557.90	13,01	89,40	MWD	1	2450,21	13,01	573,85	573,99	0,81	-0,71	-1,75
2586.80	13,25	90,58	MWD	1	2478,35	13,01	580,41	580,56	0,37	0,25	1,22
2615.90	13,12	90,84	MWD	1	2506,68	12,92	587,05	587,19	0,15	-0,13	0,27
2644.80	13,51	89,00	MWD	1	2534,81	12,94	593,70	593,85	0,60	0,40	-1,91
2673.20	13,97	90,37	MWD	1	2562,39	12,97	600,45	600,59	0,60	0,49	1,45
2680.80	13,90	90,84	MWD	1	2569,77	12,95	602,28	602,42	0,52	-0,28	1,86
2716.00	13,43	95,02	MWD	1	2603,97	12,53	610,58	610,71	0,93	-0,40	3,56
2747.10	11,78	96,93	MWD	1	2634,32	11,83	617,33	617,44	1,64	-1,59	1,84
2775.10	10,70	96,18	MWD	1	2661,79	11,21	622,75	622,85	1,17	-1,16	-0,80
2804.70	8,08	91,54	MWD	1	2690,99	10,86	627,56	627,66	2,76	-2,66	-4,70
2863.80	5,54	91,94	MWD	1	2749,67	10,65	634,57	634,66	1,29	-1,29	0,20
2892.70	3,80	92,37	MWD	1	2778,47	10,56	636,92	637,01	1,81	-1,81	0,45
2920.80	2,23	89,56	MWD	1	2806,53	10,53	638,40	638,48	1,68	-1,68	-3,00
2949.60	0,75	90,67	MWD	1	2835,32	10,53	639,14	639,23	1,54	-1,54	1,16
2975.80	0,02	138,40	MWD	1	2861,52	10,52	639,32	639,41	0,84	-0,84	54,65
3009.30	0,02	330,88	MWD	1	2895,02	10,52	639,32	639,41	0,03	0,00	-150,02
3032.20	0,05	291,46	MWD	1	2917,92	10,53	639,31	639,40	0,05	0,04	-51,64
3038.60	0,05	132,92	MWD	1	2924,32	10,53	639,31	639,39	0,46	0,00	-743,16
3084.20	0,02	298,90	MWD	1	2969,92	10,52	639,32	639,40	0,05	-0,02	109,20
3095.70	0,05	318,54	MWD	1	2981,42	10,53	639,31	639,40	0,08	0,08	51,23
3125.30	0,02	38,27	MWD	1	3011,02	10,54	639,30	639,39	0,05	-0,03	80,81
3153.80	0,09	262,50	MWD	1	3039,52	10,54	639,29	639,37	0,11	0,07	-142,92
3181.50	0,07	45,15	MWD	1	3067,22	10,55	639,28	639,36	0,16	-0,02	154,49
3200.90	0,11	291,81	MWD	1	3086,62	10,56	639,27	639,35	0,23	0,06	-175,27
3229.40	0,16	252,03	MWD	1	3115,12	10,56	639,20	639,29	0,11	0,05	-41,87

Norsk Hydro

2004-12-23

HOLE DEVIATION

Well:	30/11-6 S	Reference point:	RKB ; 29,0 m ABOVE MSL		
Waterdepth:	103,5 m	Vertical to:	132,4 m	Total Depth:	3550,0 m MD
Utm zone:	31	Central Median:	3' E	Horizontal datum:	ED50
Template Centre Coordinates, UTM:		North :	m,	East :	m
Wellhead Coordinates, UTM:		North :	6669338,40 m,	East :	479181,60 m
Official Surveys:	Y	Track :			

Coordinates are measured from the wellhead centre.

Depth MD [m]	Inclination [Deg]	Direction [Deg]	Tool Type	#	Depth TVD [m]	Coordinates		Vert. Sect [m]	Dogleg [D/30m]	Build [D/30m]	Turn [D/30m]
						North [m]	East [m]				
3257,70	0,17	236,56	MWD	1	3143,42	10,53	639,13	639,22	0,05	0,01	-16,40
3286,30	0,21	227,37	MWD	1	3172,02	10,47	639,06	639,14	0,05	0,04	-9,64
3315,90	0,11	95,36	MWD	1	3201,62	10,43	639,05	639,13	0,30	-0,10	-133,79
3346,40	0,21	281,19	MWD	1	3232,12	10,44	639,02	639,11	0,31	0,10	-171,31
3374,00	0,05	8,08	MWD	1	3259,72	10,46	638,97	639,06	0,23	-0,17	94,45
3431,20	0,08	42,36	MWD	1	3316,92	10,51	639,00	639,09	0,02	0,02	17,98
3459,30	0,02	26,43	MWD	1	3345,02	10,53	639,02	639,10	0,06	-0,06	-17,01
3518,50	0,05	180,96	MWD	1	3404,22	10,52	639,02	639,11	0,03	0,02	78,31
3539,50	0,05	33,98	MWD	1	3425,22	10,51	639,03	639,11	0,14	0,00	-209,97

Norsk Hydro

2004-12-23

MAIN CONSUMPTION OF CASING/TUBING ON WELL 30/11-6 S PO: 1

Size	Casing string	Grade	Weight		Threads type	Length [m]	No. of joints
			[kg/m]	[lb/ft]			
30"	CONDUCTOR	X-52	460,86	309,70	SL-60	97,9	8
13 3/8"	SURFACE	P-110	107,14	72,00	VAM TOP	1279,0	101
9 5/8"	PRODUCTION	L-80	79,61	53,50	VAM TOP	2564,0	206

-1-
2004-12-23

Norsk Hydro
BITRECORD FOR WELL 30/11-6 SPO: 1

Bit No	[RR] Type	Manu- fact- urer	Size (in)	Trade name	Serial no.	IADC code	Nozzles diameter (-J32in)	Flow area (in ²)	BHA no.	Depth out (m MD)	Bit meter (m)	Rot hours (hrs)	ROP (m/hr)	Rotation min/max (rpm)	Total bit revol.	Weight min/max (kN)	Flow min/max (l/min)	Pump min/max (bar)	Cutting Structure I-O-DC-L-B	Gauge 1/16 (in)	Other Remarks	Pull Cause
1	SRT	HTC	17.50	MKT09DDT	T28DR	435	24,24,24,24	1,767	1	229	97	13,10	7,4	57/103	62938	-496	39,13/4722	0,21/102,1	1-1-1-WT-A-E	1	NO	TD
2	BIT	HTC	28.00	GTKCG1	L95DW	114	18,32,32,32	2,605	2	231	2	1,50	1,3	50/110	6500	1/4	3500/4000	30/40	1-1-1-WT-A-E	1	NO	TD
3	SRT	HTC	17.50	MKT305HDX2	6009380	415	18,18,20,20	1,111	3	1415	1184	26,60	46,3	0,222	221800	0,156	0,465/2,92	0,234/54	1-1-1-WT-H-E	1	NO	TD
4	PDC	HTC	12.25	HCM605S	7002015	S323	15,15,15,15,15	1,258	4	2413	598	23,50	42,5	35/321	372300	-9,296	3,04/4244	74/282/4	2-6-RO-S-X	5	CT	PR
5	SRT	HTC	12.25	MKC18DDT	C45DR	447	10,24,24,24	1,922	5	2434	21	6,10	3,4	104/206	61300	34,295	35,22/4208	2,61/281	1-1-1-BU-A-E	1	HC	PR
6	PDC	HTC	12.25	HCM607S	7002830	S323	15,15,15,15,15	1,299	6	2536	102	8,00	12,8	170/170	96300	15/15	4100/4100	273/273	1-1-1-BU-A-X	1	NO	PR
7	PDC	HTC	12.25	HCM607S	7002830	S323	15,15,15,15,15	1,256	7	2700	184	14,80	11,1	158/342	221500	1/127	7,36/4380	2,75/312	1-1-1-NO-A-X	1	NO	TD
8	COR	HTC	8.50	HCM605	7000101	M323	11,11,11,11,12	0,462	8	3196	499	31,10	15,9	110/120	204174	0/116	2480/2425	248/250	1-3-JD-N-X	1	CT	CP
8	1	COR	8.50	URC478GB	1214130			0,000	9	3215	19	1,80	11,9	80/90	8717	10/78	1300/1000	56/75	1-1-1-NO-A-X	1		NC
8	2	COR	8.50	URC478GB	1214130			0,000	10	3269	54	4,90	11,0	87/110	8717	40/140	31,2/1093	0,59/90,5	1-1-1-NO-A-X	1	NO	NC
9	PDC	HTC	8.50	URC478GB	1214130			0,000	11	3300	31	2,70	11,5	95/110	0	1/7	1040/1070	80/88	1-1-1-NO-A-X	1	NO	CJ
0	PDC	HTC	8.50	HCM605	7201485	M323	11,11,11,11,11	0,464	12	3650	290	10,90	22,9	125/165	0	1/12	2182/2458	235/295	0-0-WT-A-X	1	NO	TD
0				HCM605	7000101	M323	32,32,32,32,32	3,927	14	2634	54		0,0	0/0	-9999	0/0	0/0	0/0		1		

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BOTTOM HOLE ASSEMBLIES USED ON WELL 30/11-6 S

BHA no. 1:		No. / Element / OD(in) / Length(m)		Depth In: 132 m MD		Out: 229 m MD	
1	MXT09DDT	17,5	0,42	9	X-OVER	9,5	0,79
2	HOLE OPENER	36,0	4,38	10	DRILL COLLAR STEEL	8,0	18,37
3	FLOAT SUB	10,0	0,51	11	JAR	8,0	9,59
4	X-OVER	9,5	0,58	12	DRILL COLLAR STEEL	8,0	27,64
5	OTHER	8,25	10,13	13	X-OVER	7,94	0,62
6	SAVER SUB	8,25	0,72	14	HWDP	5,5	54,22
7	X-OVER	9,5	0,87	15	DRILL PIPE	5,5	28,97
8	NEAR BIT STAB	9,5	2,10				

Reason pulled: TOTAL DEPTH/CASING DEPTH Total Length: 159,91 m

BHA no. 2:		No. / Element / OD(in) / Length(m)		Depth In: 229 m MD		Out: 231 m MD	
1	GTXCG1	28,0	0,56	7	JAR	8,0	9,59
2	NEAR BIT STAB	9,5	2,30	8	DRILL COLLAR STEEL	8,0	27,64
3	X-OVER	9,5	0,87	9	X-OVER	7,94	0,62
4	DRILL COLLAR STEEL	8,0	9,25	10	HWDP	5,5	54,07
5	OTHER	8,0	1,55	11	DRILL PIPE	5,5	116,43
6	DRILL COLLAR STEEL	8,0	9,12				

Reason pulled: TOTAL DEPTH/CASING DEPTH Total Length: 232,00 m

BHA no. 3:		No. / Element / OD(in) / Length(m)		Depth In: 231 m MD		Out: 1415 m MD	
1	MXT305HDX2	17,5	0,41	9	DRILL COLLAR STEEL	8,063	9,14
2	DOWNHOLE MOTOR	12,75	10,40	10	DRILL COLLAR STEEL	8,0	18,37
3	STEEL STAB	9,5	1,93	11	JAR	8,0	9,59
4	X-OVER	9,5	1,58	12	DRILL COLLAR STEEL	8,0	27,64
5	MEASUREMENT WHILE DRILLING	8,25	4,94	13	X-OVER	7,94	0,62
6	LOGGING WHILE DRILLING TOOL	8,25	11,13	14	HWDP	5,5	54,07
7	SAVER SUB	8,25	0,72	15	DRILL PIPE	5,5	1304,27
8	STEEL STAB	8,0	1,55				

Reason pulled: TOTAL DEPTH/CASING DEPTH Total Length: 1456,36 m

BHA no. 4:		No. / Element / OD(in) / Length(m)		Depth In: 1415 m MD		Out: 2413 m MD	
1	HCM605S	12,25	0,36	9	DRILL COLLAR STEEL	8,063	9,14
2	DOWNHOLE MOTOR	9,5	8,83	10	DRILL COLLAR STEEL	8,0	18,37
3	STEEL STAB	8,0	1,79	11	JAR	8,0	9,59
4	PIN SUB	8,25	0,71	12	DRILL COLLAR STEEL	8,0	27,64
5	MEASUREMENT WHILE DRILLING	8,25	4,94	13	X-OVER	7,94	0,62
6	MEASUREMENT WHILE DRILLING	8,25	11,13	14	HWDP	5,5	54,07
7	SAVER SUB	8,25	0,72	15	DRILL PIPE	5,5	1079,55
8	STEEL STAB	8,0	2,47				

Reason pulled: PENETRATION RATE Total Length: 1229,93 m

BHA no. 5:		No. / Element / OD(in) / Length(m)		Depth In: 2413 m MD		Out: 2434 m MD	
1	MXC18DDT	12,25	0,34	8	DRILL COLLAR STEEL	8,0	18,37
2	DOWNHOLE MOTOR	9,5	8,85	9	JAR	8,0	9,59
3	X-OVER	8,25	0,71	10	DRILL COLLAR STEEL	8,0	27,64
4	MEASUREMENT WHILE DRILLING	8,25	5,05	11	X-OVER	7,94	0,62
5	MEASUREMENT WHILE DRILLING	8,25	11,15	12	HWDP	5,5	54,07
6	SAVER SUB	8,25	0,97	13	DRILL PIPE	5,5	2892,89
7	DRILL COLLAR STEEL	8,063	9,14				

Reason pulled: PENETRATION RATE Total Length: 3039,39 m

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BOTTOM HOLE ASSEMBLIES USED ON WELL 30/11-6 S

BHA no. 6:		No. / Element / OD(in) / Length(m)		Depth In: 2434 m MD Out: 2536 m MD			
1	HCM607S	12,25	0,32	8	DRILL COLLAR STEEL	8,0	18,37
2	DOWNHOLE MOTOR	9,5	8,85	9	JAR	8,0	9,59
3	X-OVER	8,25	0,71	10	DRILL COLLAR STEEL	8,0	27,64
4	MEASUREMENT WHILE DRILLING	8,25	5,05	11	X-OVER	7,94	0,62
5	MEASUREMENT WHILE DRILLING	8,25	11,15	12	HWDP	5,5	54,07
6	SAVER SUB	8,25	0,97	13	DRILL PIPE	5,5	2892,89
7	DRILL COLLAR STEEL	8,063	9,14				

Reason pulled: PENETRATION RATE Total Length: 3039,37 m

BHA no. 7:		No. / Element / OD(in) / Length(m)		Depth In: 2536 m MD Out: 2700 m MD			
1	HCM607S	12,25	0,32	8	DRILL COLLAR STEEL	8,0	18,37
2	DOWNHOLE MOTOR	9,5	8,85	9	JAR	8,0	9,59
3	X-OVER	8,25	0,71	10	DRILL COLLAR STEEL	8,0	27,64
4	MEASUREMENT WHILE DRILLING	8,25	5,05	11	X-OVER	7,94	0,62
5	MEASUREMENT WHILE DRILLING	8,25	11,15	12	HWDP	5,5	54,07
6	SAVER SUB	8,25	0,97	13	DRILL PIPE	5,5	2892,89
7	DRILL COLLAR STEEL	8,063	9,14				

Reason pulled: TOTAL DEPTH/CASING DEPTH Total Length: 3039,37 m

BHA no. 8:		No. / Element / OD(in) / Length(m)		Depth In: 2700 m MD Out: 3196 m MD			
1	HCM605	8,5	0,30	9	FLOAT SUB	6,375	0,71
2	AUTOTRAK	7,75	2,17	10	NON MAG. COLLAR	6,5	17,17
3	STEEL STAB	7,0	1,22	11	JAR	6,5	9,93
4	MEASUREMENT WHILE DRILLING	7,0	5,00	12	HWDP	5,0	56,22
5	STEEL STAB	7,0	1,24	13	DRILL PIPE	5,0	805,42
6	MEASUREMENT WHILE DRILLING	7,125	3,15	14	X-OVER	5,5	0,80
7	STOP SUB	7,0	0,50	15	DRILL PIPE	5,5	2892,89
8	STEEL STAB	6,75	1,90				

Reason pulled: CORE POINT Total Length: 3798,62 m

BHA no. 9:		No. / Element / OD(in) / Length(m)		Depth In: 3196 m MD Out: 3215 m MD			
1	URC478G8	8,5	0,43	9	FLOAT SUB	6,37	0,71
2	STEEL STAB	7,25	0,79	10	CIRCULATING SUB	6,5	0,58
3	CORE BARREL	6,75	8,35	11	DRILL COLLAR STEEL	6,5	17,17
4	STEEL STAB	7,25	0,79	12	JAR	6,5	9,93
5	CORE BARREL	6,75	8,35	13	HWDP	5,5	56,22
6	STEEL STAB	7,25	0,79	14	DRILL PIPE	5,0	805,42
7	CORE BARREL	7,25	0,93	15	X-OVER	5,5	0,80
8	STOP SUB	7,25	0,46	16	DRILL PIPE	5,5	2892,89

Reason pulled: NEW CORE/FULL BARREL Total Length: 3804,61 m

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BOTTOM HOLE ASSEMBLIES USED ON WELL 30/11-6 S

BHA no. 10:	No. / Element / OD(in) / Length(m)		Depth In: 3215 m MD		Out: 3269 m MD	
1	URC478G8	8,5 0,43	13	CORE BARREL	6,75	8,35
2	STEEL STAB	7,25 0,79	14	STEEL STAB	7,25	0,79
3	CORE BARREL	6,75 8,35	15	CORE BARREL	7,25	0,93
4	STEEL STAB	7,25 0,79	16	STOP SUB	7,25	0,46
5	CORE BARREL	6,75 8,35	17	FLOAT SUB	6,37	0,71
6	STEEL STAB	7,25 0,79	18	CIRCULATING SUB	6,5	0,58
7	CORE BARREL	6,75 8,35	19	NON MAG. COLLAR	6,5	17,17
8	STEEL STAB	7,25 0,79	20	JAR	6,5	9,93
9	CORE BARREL	6,75 8,35	21	HWDP	5,5	56,22
10	STEEL STAB	7,25 0,79	22	DRILL PIPE	5,0	805,42
11	CORE BARREL	6,75 8,35	23	X-OVER	5,5	0,68
12	STEEL STAB	7,25 0,79	24	DRILL PIPE	5,5	2892,89

Reason pulled: NEW CORE/FULL BARREL

Total Length: 3841,05 m

BHA no. 11:	No. / Element / OD(in) / Length(m)		Depth In: 3269 m MD		Out: 3300 m MD	
1	URC478G8	8,5 0,43	13	CORE BARREL	6,75	8,35
2	STEEL STAB	7,25 0,79	14	STEEL STAB	7,25	0,79
3	CORE BARREL	6,75 8,35	15	CORE BARREL	7,25	0,93
4	STEEL STAB	7,25 0,79	16	STOP SUB	7,25	0,46
5	CORE BARREL	6,75 8,35	17	FLOAT SUB	6,37	0,71
6	STEEL STAB	7,25 0,79	18	CIRCULATING SUB	6,5	0,58
7	CORE BARREL	6,75 8,35	19	NON MAG. COLLAR	6,5	17,17
8	STEEL STAB	7,25 0,79	20	JAR	6,5	9,93
9	CORE BARREL	6,75 8,35	21	HWDP	5,5	56,22
10	STEEL STAB	7,25 0,79	22	DRILL PIPE	5,0	805,42
11	CORE BARREL	6,75 8,35	23	X-OVER	5,5	0,68
12	STEEL STAB	7,25 0,79	24	DRILL PIPE	5,5	2892,89

Reason pulled: CORE JAMMED

Total Length: 3841,05 m

BHA no. 12:	No. / Element / OD(in) / Length(m)		Depth In: 3300 m MD		Out: 3550 m MD	
1	HCM605	8,5 0,29	9	FLOAT SUB	6,375	0,71
2	AUTOTRAK	7,75 2,17	10	NON MAG. COLLAR	6,5	17,17
3	STEEL STAB	7,0 1,22	11	JAR	6,5	9,93
4	MEASUREMENT WHILE DRILLING	7,0 5,00	12	HWDP	5,0	56,22
5	STEEL STAB	7,0 1,24	13	DRILL PIPE	5,0	805,42
6	MEASUREMENT WHILE DRILLING	7,125 3,15	14	X-OVER	5,5	0,80
7	STOP SUB	7,0 0,50	15	DRILL PIPE	5,5	2892,89
8	STEEL STAB	6,75 1,90				

Reason pulled: TOTAL DEPTH/CASING DEPTH

Total Length: 3798,61 m

BHA no. 13:	No. / Element / OD(in) / Length(m)		Depth In: 3550 m MD		Out: 3550 m MD	
1	CEMENT STINGER	3,5 2,73	4	DRILL PIPE	5,0	546,84
2	DRILL PIPE	3,5 322,57	5	X-OVER	7,12	0,68
3	X-OVER	6,5 0,65	6	DRILL PIPE	5,5	2892,89

Total Length: 3766,36 m

BHA no. 14:	No. / Element / OD(in) / Length(m)		Depth In: 2580 m MD		Out: 2634 m MD	
1	HCM605	8,5 0,30	5	HWDP	5,5	56,22
2	FLOAT SUB	6,5 0,96	6	DRILL PIPE	5,0	335,15
3	DRILL COLLAR STEEL	6,5 17,17	7	X-OVER	5,5	0,68
4	JAR	6,5 9,93	8	DRILL PIPE	5,5	3177,90

Total Length: 3598,31 m

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BOTTOM HOLE ASSEMBLIES USED ON WELL 30/11-6 S

BHA no. 15:	No. / Element / OD(in) / Length(m)	Depth In: 403 m MD	Out: 403 m MD
1	CASING CUTTER 10,75 1,85	7	X-OVER 8,0 0,46
2	FLOAT SUB 6,5 0,94	8	DRILL PIPE 5,0 7,74
3	DRILL COLLAR STEEL 5,0 2,99	9	OTHER 8,75 4,25
4	DRILL PIPE 5,0 268,15	10	HWDP 5,0 56,22
5	X-OVER 7,75 0,42	11	X-OVER 7,12 0,68
6	OTHER 13,87 1,81	12	DRILL PIPE 5,5 86,55

Total Length: 432,06 m

BHA no. 19:	No. / Element / OD(in) / Length(m)	Depth In: 138 m MD	Out: 0 m MD
1	CASING CUTTER 11,75 2,97	5	BUMPER SUB 8,0 1,52
2	STEEL STAB 8,0 1,78	6	DRILL COLLAR STEEL 8,0 27,64
3	DIVERTER SUB 7,75 0,99	7	X-OVER 8,0 0,61
4	DOWNHOLE MOTOR 8,0 8,99	8	DRILL PIPE 5,5 403,62

Total Length: 448,12 m

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DAILY MUD PROPERTIES: RHEOLOGY PARAMETERS FOR WELL 30/11-6 S PO: 1

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Hole section : 36" WATER BASED SYSTEM

Date	Depth [m]	Mud Type	Funnel Visc [sec]	Dens [sg]	Mudtmp Out [DegC]	Fann Readings	Rheo Test [DegC]	PV [mPas]	YP [Pa]	Gel10 [Pa]
	MD	TVD				600 300 200 100 60 30 6 3				
2004-06-03	277	277	SPUD MUD	1.00		0 0	15.0			

Hole section : 17 1/2" WATER BASED SYSTEM

Date	Depth [m]	Mud Type	Funnel Visc [sec]	Dens [sg]	Mudtmp Out [DegC]	Fann Readings	Rheo Test [DegC]	PV [mPas]	YP [Pa]	Gel10 [Pa]
	MD	TVD				600 300 200 100 60 30 6 3				
2004-06-04	1023	1022	SPUD MUD	1.00		0 0	13.0			
2004-06-05	1415	1393	SPUD MUD	1.00		0 0	14.0			
2004-06-06	1415	1393	SPUD MUD	1.30		0 0	14.0			
2004-06-07	1415	1393	SPUD MUD	1.30		0 0	13.0			
2004-06-08	1415	1393	KCL/POLYMER	1.44	45.0	76 52 42 30 0 0 10 7	50.0	24.0	14.0	4.5 10.0

Hole section : 12 1/4" WATER BASED SYSTEM

Date	Depth [m]	Mud Type	Funnel Visc [sec]	Dens [sg]	Mudtmp Out [DegC]	Fann Readings	Rheo Test [DegC]	PV [mPas]	YP [Pa]	Gel10 [Pa]
	MD	TVD				600 300 200 100 60 30 6 3				
2004-06-09	1941	1874	KCL/POLYMER	1.45	43.0	91 66 55 42 0 0 17 14	50.0	25.0	20.5	8.0 16.5
2004-06-10	2372	2272	KCL/POLYMER	1.45	61.0	112 79 66 49 0 0 18 14	50.0	33.0	23.0	8.5 16.5
2004-06-11	2413	2310	KCL/POLYMER	1.45	30.0	104 74 61 45 0 0 16 13	50.0	30.0	22.0	6.5 12.5
2004-06-12	2434	2330	KCL/POLYMER	1.45	30.0	100 71 59 40 0 0 16 13	50.0	29.0	21.0	6.5 13.0
2004-06-13	2534	2427	KCL/POLYMER	1.45	65.0	92 66 56 42 0 0 15 12	50.0	26.0	20.0	7.0 14.0
2004-06-14	2565	2457	KCL/POLYMER	1.45	57.0	93 68 57 43 0 0 16 13	50.0	25.0	21.5	7.0 14.5
2004-06-15	2700	2588	KCL/POLYMER	1.45	53.0	97 70 59 44 0 0 16 13	50.0	27.0	21.5	5.5 14.5
2004-06-16	2700	2588	KCL/POLYMER	1.45	30.0	97 70 59 44 0 0 16 13	50.0	27.0	21.5	5.5 14.5
2004-06-17	2700	2588	KCL/POLYMER	1.45	38.0	97 70 59 44 0 0 16 13	50.0	27.0	21.5	5.5 14.5
2004-06-18	2740	2627	KCL/POLYMER	1.45	25.0	74 51 41 29 0 0 9 7	50.0	23.0	14.0	4.0 6.0

Hole section : 8 1/2" WATER BASED SYSTEM

Date	Depth [m]	Mud Type	Funnel Visc [sec]	Dens [sg]	Mudtmp Out [DegC]	Fann Readings	Rheo Test [DegC]	PV [mPas]	YP [Pa]	Gel10 [Pa]
	MD	TVD				600 300 200 100 60 30 6 3				
2004-06-19	3088	2974	KCL/POLYMER	1.45	44.0	82 61 53 39 0 0 15 12	50.0	21.0	20.0	6.5 9.5
2004-06-20	3196	3082	KCL/POLYMER	1.45	18.0	76 56 47 36 0 0 14 12	50.0	20.0	18.0	6.0 9.0
2004-06-21	3223	3109	KCL/POLYMER	1.45	28.0	78 57 48 36 0 0 14 12	50.0	21.0	18.0	6.0 8.8

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DAILY MUD PROPERTIES: RHEOLOGY PARAMETERS FOR WELL 30/11-6 S PO: 1

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WATER BASED SYSTEM																		
Hole section : 8 1/2"																		
Date	Depth [m]	Mud Type	Funnel Visc [sec]	Dens Mudtmp Out [sg]	Dens Mudtmp Out [DegC]	Fann Readings					Rheo Test [DegC]	PV [mPas]	YP [Pa]	Gel10 [Pa]				
						600	300	200	100	60					30	6	3	
	MD	TVD				600	300	200	100	60	30	6	3					
2004-06-22	3279	3165	KCL/POLYMER	63,0	1,45	37,0	85	63	53	39	0	14	12	50,0	22,0	20,5	6,0	9,0
2004-06-23	3300	3186	KCL/POLYMER		1,45		89	65	55	41	0	14	12	50,0	24,0	20,5	6,0	8,5
2004-06-24	3550	3436	KCL/POLYMER	51,0	1,45		81	61	50	39	0	14	12	50,0	20,0	20,5	6,0	8,5
2004-06-25	3550	3436	KCL/POLYMER		1,45		81	61	50	39	0	14	12	50,0	20,0	20,5	6,0	8,5
2004-06-26	3550	3436	KCL/POLYMER		1,45		81	61	50	39	0	14	12	50,0	20,0	20,5	6,0	8,5
2004-06-27	3550	3436	KCL/POLYMER		1,48		90	68	58	44	0	15	12	50,0	22,0	23,0	6,0	8,5

WATER BASED SYSTEM																		
Hole section : P&A																		
Date	Depth [m]	Mud Type	Funnel Visc [sec]	Dens Mudtmp Out [sg]	Dens Mudtmp Out [DegC]	Fann Readings					Rheo Test [DegC]	PV [mPas]	YP [Pa]	Gel10 [Pa]				
						600	300	200	100	60					30	6	3	
	MD	TVD				600	300	200	100	60	30	6	3					
2004-06-28	2750	2637	KCL/POLYMER		1,45	24,0	83	61	51	38	0	12	9	50,0	22,0	19,5	5,0	7,0
2004-06-29	2634	2524	KCL/POLYMER		1,47		83	61	51	38	0	12	9	50,0	22,0	19,5	5,0	7,0
2004-06-30	0	0	KCL/POLYMER							0	0							

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DAILY MUD PROPERTIES : OTHER PARAMETERS FOR WELL 30/11-6 S PO: 1

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Hole section : 36" WATER BASED SYSTEM

Date	Depth [m]	Mud Type	Dens [sg]	Filtrate API [mm]	HPHT API [mm]	HPHT Press/Temp [bar/DegC]	pH	Alcalinity Pm [ml]	Alcalinity Pf [ml]	Inhib Chem [mg/l]	K+ [mg/l]	CL- [mg/l]	Ca++ [mg/l]	Mg++ [mg/l]	Tot hard Solid Oil Sand [%]	Percentage [%]	CEC [Kg/m3]	ASG [Kg/m3]	LGS	
MD	TVD																			
2004-06-03	277	277 SPUD MUD	1.00	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/

Hole section : 17 1/2" WATER BASED SYSTEM

Date	Depth [m]	Mud Type	Dens [sg]	Filtrate API [mm]	HPHT API [mm]	HPHT Press/Temp [bar/DegC]	pH	Alcalinity Pm [ml]	Alcalinity Pf [ml]	Inhib Chem [mg/l]	K+ [mg/l]	CL- [mg/l]	Ca++ [mg/l]	Mg++ [mg/l]	Tot hard Solid Oil Sand [%]	Percentage [%]	CEC [Kg/m3]	ASG [Kg/m3]	LGS	
MD	TVD																			
2004-06-04	1023	1022 SPUD MUD	1.00	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
2004-06-05	1415	1393 SPUD MUD	1.00	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
2004-06-06	1415	1393 SPUD MUD	1.30	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
2004-06-07	1415	1393 SPUD MUD	1.30	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/	/
2004-06-08	1415	1393 KCL/POLYMER	1.44	5.0	1	/	8.5	0.8	0.0	0.8	65000				17.0	3.0	0.5	60	3.7	112

Hole section : 12 1/4" WATER BASED SYSTEM

Date	Depth [m]	Mud Type	Dens [sg]	Filtrate API [mm]	HPHT API [mm]	HPHT Press/Temp [bar/DegC]	pH	Alcalinity Pm [ml]	Alcalinity Pf [ml]	Inhib Chem [mg/l]	K+ [mg/l]	CL- [mg/l]	Ca++ [mg/l]	Mg++ [mg/l]	Tot hard Solid Oil Sand [%]	Percentage [%]	CEC [Kg/m3]	ASG [Kg/m3]	LGS			
MD	TVD																					
2004-06-09	1941	1874 KCL/POLYMER	1.45	3.6	1	/	8.2	0.9	0.0	1.8	83000	93000				19.0	3.0	0.3	56	3.9	66	
2004-06-10	2372	2272 KCL/POLYMER	1.45	2.6	1	/	7.8	0.9	0.0	1.9	86000	98000	40			40	19.5	3.2	0.2	49	3.7	104
2004-06-11	2413	2310 KCL/POLYMER	1.45	2.8	1	/	7.9		0.0	1.8	85800	103000	30			30	20.0	3.4	0.2	64	3.6	144
2004-06-12	2434	2330 KCL/POLYMER	1.45	3.2	1	/	7.7		0.0	1.7	86900	98000	40			40	20.0	3.6	0.2	64	3.6	146
2004-06-13	2534	2427 KCL/POLYMER	1.45	3.4	1	/	8.0	0.9	0.0	1.4	86900	104000	40			20.0	3.2	0.1	63	3.5	169	
2004-06-14	2565	2457 KCL/POLYMER	1.45	3.2	1	/	7.8	0.6	0.0	1.8	101000	110500	45			21.0	4.4	0.1	56	3.4	173	
2004-06-15	2700	2588 KCL/POLYMER	1.45	3.0	1	/	8.1	0.6	0.0	1.6	99000	104000	45			21.0	4.5	0.1	64	3.5	164	
2004-06-16	2700	2588 KCL/POLYMER	1.45	3.0	1	/	8.1	0.6	0.0	1.7	99000	104000	45			21.0	4.5	0.1	64	3.5	164	
2004-06-17	2700	2588 KCL/POLYMER	1.45	3.0	1	/	8.1	0.6	0.0	1.8	99000	104000	45			21.0	4.5	0.1	64	3.5	164	
2004-06-18	2740	2627 KCL/POLYMER	1.45	2.5	1	/	8.5		0.0	1.0	72000	75000	400			400	16.5	4.0	0.0	7	4.1	19

Hole section : 8 1/2" WATER BASED SYSTEM

Date	Depth [m]	Mud Type	Dens [sg]	Filtrate API [mm]	HPHT API [mm]	HPHT Press/Temp [bar/DegC]	pH	Alcalinity Pm [ml]	Alcalinity Pf [ml]	Inhib Chem [mg/l]	K+ [mg/l]	CL- [mg/l]	Ca++ [mg/l]	Mg++ [mg/l]	Tot hard Solid Oil Sand [%]	Percentage [%]	CEC [Kg/m3]	ASG [Kg/m3]	LGS			
MD	TVD																					
2004-06-19	3088	2974 KCL/POLYMER	1.45	2.2	1	/	7.8	0.0	1.0	1.0	98000	100000	400			400	19.0	4.0	0.0	14	3.8	75
2004-06-20	3196	3082 KCL/POLYMER	1.45	2.6	1	/	8.1	0.0	0.9	0.9	97000	102000	400			400	19.0	4.0	0.0	11	3.8	75
2004-06-21	3223	3109 KCL/POLYMER	1.45	2.2	1	/	8.0	0.0	1.0	1.0	95000	100000	400			400	19.0	4.0	0.0	14	3.8	80
2004-06-22	3279	3165 KCL/POLYMER	1.45	2.2	1	/	8.3	0.0	1.0	1.0	96000	102000	400	0		400	19.0	4.0	0.0	14	3.8	77

TOTAL CONSUMPTION OF MUD ADDITIVES ON WELL 30/11-6 S PO: 1

Section	Product/ Additive	Unit	Total Amount Used
36"	BARITE	kg	150000,00
	BENTONITE	kg	8000,00
	CMC EHV	kg	225,00
	DUOTEC NS	kg	125,00
	NUTPLUG M	kg	100,00
	SODA ASH	kg	225,00
17 1/2"	BARITE	kg	102000,00
	BENTONITE	kg	26800,00
	CMC EHV	kg	875,00
	SODA ASH	kg	125,00
12 1/4"	BARITE	kg	237000,00
	CITRIC ACID	kg	400,00
	DUOTEC NS	kg	2325,00
	GLYDRIL MC	l	20500,00
	KCL BRINE	l	60000,00
	KCL POWDER	kg	14000,00
	LIME	kg	340,00
	MICA F/MC	kg	18000,00
	NUTPLUG M	kg	200,00
	POLYPAC ELV	kg	7775,00
	SODA ASH	kg	750,00
	SODIUM BICARBONATE	kg	275,00
8 1/2"	BARITE	kg	37000,00
	CITRIC ACID	kg	1475,00
	DUOTEC NS	kg	175,00
	GLYDRIL MC	l	4500,00
	KCL BRINE	l	8000,00
	POLYPAC ELV	kg	250,00
	SODA ASH	kg	125,00
	SODIUM BICARBONATE	kg	1175,00

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2004-12-23

CEMENT SLURRY REPORT ON WELL 30/11-6 S PO: 1

Norsk Hydro

Date	CsgSize	Jobtype	Slurry Type	Pumped Volume [m3]	Density [sg]	BHCT [DegC]	Yield [l/100 kg]	Additive	Unit	Additives [./100 kg Cement]	Additives [./m3 Slurry]
2004-06-02	30"	CASING CEMENTING	DISPLACEMENT	0.25	1.03	19.00					
			WATER BASED MUD SPACER (WEIGHTED)	4.00	4.00	19.00					
			TAIL SLURRY	25.00	1.95	19.00	74.51	D077	l	2.00	
			LEAD	44.00	1.44	19.00	169.12	B-143	l	0.10	
2004-06-07	13 3/8"	CASING CEMENTING	DISPLACEMENT	20.00	1.03	23.00	76.61	B165	l	1.00	
			TAIL SLURRY	22.00	1.90	23.00		D193	l	6.00	
			LEAD	164.00	1.44	23.00	169.12	B-143	l	0.10	
								D075	l	4.00	
2004-06-17	9 5/8"	CASING CEMENTING	DISPLACEMENT	2.00	1.03	23.00					
			DISPLACEMENT	10.00	1.00	73.00					
			DISPLACEMENT	2.00	1.00	73.00					
			TAIL SLURRY	20.50	1.80	73.00	93.87	B018	l	15.00	
2004-06-27	PLUG IN OPEN HOLE	SPACER	8.00	1.60	73.00						
		SPACER	10.00	1.60	105.00						
		WATER BASED MUD SPACER (WEIGHTED)	31.30	1.48	105.00						
		SPACER	2.90	1.60	105.00						
		TAIL SLURRY	11.40	1.52	105.00	103.31	B-143	l	0.10		
		DISPLACEMENT					B018	l	10.00		
					B151	l	1.70				
					B165	l	2.50				
					D066	kg	35.00				
					D193	l	3.50				
							105.00				

CEMENT SLURRY REPORT ON WELL 30/11-6 S PO: 1

Date	CsgSize	Jobtype	Slurry Type	Pumped Volume [m3]	Density [sg]	BHCT [DegC]	Yield [l/100 kg]	Additive	Unit	Additives [./100 kg Cement]	Additives [./m3 Slurry]
2004-06-30	13 3/8"	PLUG IN CAISED HOLE	DISPLACEMENT	1,20	1,00	26,00					
			TAIL SLURRY	17,00	2,00	26,00	69,01	B-143	I	0,10	
								B-165	I	1,40	

Norsk Hydro

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2004-12-23

CEMENT CONSUMPTION PER JOB ON WELL 30/11-6 S PO: 1

Date	CsgSize	Job Type	Cement/ Additive	Description	Unit	Actual Amount Used
2004-06-02	30"	CASING CEMENTING	B-143	B-143	l	
			D075	EXTENDER: LIQUID EXTENDER FOR HIGH-YIELD S	l	
			D077	ACCELERATOR: LIQUID ACCELERATOR	l	
			FLUORE	FLUORECEIN	l	
			G	API CLASS G	MT	
2004-06-07	13 3/8"	CASING CEMENTING	B-143	B-143	l	
			B165	DISPERSANT: B165	l	
			D075	EXTENDER: LIQUID EXTENDER FOR HIGH-YIELD S	l	
			D193	FLUID LOSS: D193	l	
			G	API CLASS G	MT	
2004-06-17	9 5/8"	CASING CEMENTING	B-143	B-143	l	
			B018	GAS BLOCK ADDITIVE MICROBLOCK	l	
			B165	DISPERSANT: B165	l	
			B174	B174 - Viscosifier for MUDPUSH II Spacer	l	
			D077	ACCELERATOR: LIQUID ACCELERATOR	l	
			D193	FLUID LOSS: D193	l	
			G	API CLASS G	MT	
2004-06-27		PLUG IN OPEN HOLE	B-143	B-143	l	
			B018	GAS BLOCK ADDITIVE MICROBLOCK	l	
			B151	RETARDER: B151	l	
			B165	DISPERSANT: B165	l	
			B174	B174 - Viscosifier for MUDPUSH II Spacer	l	
			D066	SPECIAL ADDITIVE: SILICA FLOUR	kg	
			D077	ACCELERATOR: LIQUID ACCELERATOR	l	
			D193	FLUID LOSS: D193	l	
			G	API CLASS G	MT	
			SCMT	SILICA CEMENT	MT	
2004-06-30	13 3/8"	PLUG IN CASED HOLE	B-143	B-143	l	
			B-165	DISPERSANT: B-165	l	
			G	API CLASS G	MT	

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2004-12-23

DOWNTIME REPORT FOR WELL/CONTRACTOR

Norsk Hydro

Well	Rep#	Hrs	Date	Downtime Type	Short Description	Resp. Contractor	Nefi Type	Equipment Type	Service Type
30/11-6 S	1	1.0	2004-06-06	Other	Found bolt on rig floor. Could not be identified. Derrick checked carefully	ODFJELL DRILLING E			
	2	1.0	2004-06-08	Equipment failure	BCP connector not functioning with 1500 psi.	ODFJELL DRILLING E	BOp Stack	WELLCONTROL E	SUB-SEA EQUIPA
	3	1.0	2004-06-09	Equipment failure	Resistivity sensors in the MWD tool failed.	BAKER HUGHES INTL	MWD/LWD	DRILLSTRING/DOI	MWD/LWD
	4	0.5	2004-06-13	Equipment failure	High temperature in the MP transformer room.	ODFJELL DRILLING E	Rig Power Supply	MISCELLANEOUS	RIG UTILITIES
	6	0.5	2004-06-15	Equipment failure	Changed suction valve on MP # 1.	ODFJELL DRILLING E	Mud Supply(Ind)	MUD AND BULK S	RIG UTILITIES
	7	1.0	2004-06-18	Other	Bent one single lowering the top drive onto it.	ODFJELL DRILLING E			
	8	1.0	2004-06-18	Equipment failure	Damaged threads. Changed saver sub.	ODFJELL DRILLING E	Traveling Equipme	HOISTING EQUIPA	RIG UTILITIES
	9	1.5	2004-06-20	Equipment failure	Changed wire on the stand lift.	ODFJELL DRILLING E	Vertical Pipe Hand	PIPE HANDLING E	RIG UTILITIES
	10	0.5	2004-06-23	Equipment failure	Bent drillpipe when landing DCM on DP joint while picking up DP from deck.	ODFJELL DRILLING E	Drillpipe	DRILLSTRING/DOI	DRILLING CONTF
	11	0.5	2004-06-27	Other	Stopped to inspect equipment for loose objects, potential falling objects. after two bolts were found on the drifloor. Bolts belonged to IRA.	ODFJELL DRILLING E			
	12	1.0	2004-06-27	Equipment failure	Damaged connection on top of cement stand.	ODFJELL DRILLING E	Drillpipe	DRILLSTRING/DOI	DRILLING CONTF
	14	0.5	2004-06-29	Equipment failure	Hydraulic problem with Casing tong.	ODFJELL DRILLING E	Casing Running T	MISCELLANEOUS	CASING/TUBING
	13	3.0	2004-06-29	Equipment failure	Hydraulic Running Tool to set Bridge Plug did not release as planned	PEAK WELL SOLUTIC	Permanent packer	SERVICE EQUIPM	DOWNHOLE CAS

Norsk Hydro

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2004-12-23

TIME DISTRIBUTION

Well: 30/11-6 S **PO:** 1 **Start date:** 1980-01-01 **Rig:** DEEPSEA DELTA **Depth:** 3549.9 m MD
All sections **Stop date:** 2004-12-23

Operations	Hours	%	Hours	%	Acc. total
MOBILIZATION					
MOVING	13,0	1,64			
MOORING; RUNNING ANCHORS	34,5	4,34			
MOORING; PULLING ANCHORS	26,5	3,33			
Sum.....			74,0	9,31	74,0
DRILLING					
BHA HANDLING/TESTING	30,5	3,84			
MWD HANDLING/TESTING/SURVEYING	2,0	0,25			
TRIPPING IN CASED HOLE	45,0	5,66			
TRIPPING IN OPEN HOLE	23,0	2,89			
DRILLING	217,5	27,36			
OTHER	11,0	1,38			
WELLHEAD EQUIPMENT INSTALLATION	0,5	0,06			
REAMING	6,0	0,75			
CIRC. AND COND. MUD/HOLE	25,0	3,14			
WIPER TRIP	7,0	0,88			
CASING HANDLING/TESTING	11,5	1,45			
RUNNING CASING IN CASED HOLE	17,5	2,20			
RUNNING CASING IN OPEN HOLE	26,0	3,27			
DRILLING OUT OF CASING	1,0	0,13			
PRIMARY CEMENTING	19,0	2,39			
TRIPPING FOR CEMENT JOB	1,0	0,13			
DRILLING OUT CEMENT PLUG	3,0	0,38			
FORMATION STRENGTH TESTING	2,5	0,31			
BOP HANDLING	10,0	1,26			
BOP RUNNING/RETRIEVING	8,0	1,01			
BOP TESTING	7,0	0,88			
WELLHEAD EQUIPMENT HANDLING	5,0	0,63			
CONDUCTOR CLEAN OUT	0,5	0,06			
RIG MAINTENANCE	0,5	0,06			
SLIP AND CUT DRILLING LINE	0,5	0,06			
Sum.....			480,5	60,44	554,5
FORMATION EVALUATION MWD					
LOGGING WITH MWD	3,0	0,38			
Sum.....			3,0	0,38	557,5
FORMATION EVALUATION LOGGING					
LOGGING	17,0	2,14			
LOGGING EQUIPMENT HANDLING/TESTING	11,5	1,45			
FORMATION TESTER	13,5	1,70			
VERTICAL SEISMIC	6,0	0,75			
Sum.....			48,0	6,04	605,5
FORMATION EVALUATION CORING					
BHA HANDLING/TESTING	6,0	0,75			
TRIPPING IN CASED HOLE	39,0	4,91			
CORING EQUIPMENT/CORE HANDLING	9,5	1,19			
TRIPPING IN OPEN HOLE	11,5	1,45			
OTHER	2,0	0,25			
CORING	10,0	1,26			
CIRC. AND COND. MUD/HOLE	5,0	0,63			
SLIP AND CUT DRILLING LINE	1,0	0,13			
Sum.....			84,0	10,57	689,5
SUBSEA STRUCTURE					
STRUCTURE MODULE OPERATIONS	1,0	0,13			
Sum.....			1,0	0,13	690,5
PLUG AND ABANDONMENT					
BHA HANDLING/TESTING	10,0	1,26			

Norsk Hydro

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2004-12-23

TIME DISTRIBUTION

Well: 30/11-6 S **PO:** 1 **Start date:** 1980-01-01 **Rig:** DEEPSEA DELTA **Depth:** 3549.9 m MD
All sections **Stop date:** 2004-12-23

Operations	Hours	%	Hours	%	Acc. total
PLUG AND ABANDONMENT					
TRIPPING IN CASED HOLE	6.5	0.82			
TRIPPING IN OPEN HOLE	0.5	0.06			
OTHER	0.5	0.06			
CIRC. AND COND. MUD/HOLE	4.5	0.57			
TRIPPING FOR CEMENT JOB	14.5	1.82			
BOP HANDLING	5.0	0.63			
BOP RUNNING/RETRIEVING	6.0	0.75			
WELLHEAD EQUIPMENT HANDLING	4.0	0.50			
SET CEMENT PLUG	15.5	1.95			
SET MECHANICAL PLUG	2.5	0.31			
TRIPPING OF CASING CUTTING EQUIPMENT	8.5	1.07			
CUT CASING/WELLHEAD	9.0	1.13			
CASING RETRIEVING	4.0	0.50			
RIG MAINTENANCE	0.5	0.06			
Sum.			91.5	11.51	782.0
DOWNTIME DRILLING					
EQUIPMENT FAILURE AND REPAIR	4.0	0.50			
OTHER	2.0	0.25			
Sum.			6.0	0.75	788.0
DOWNTIME FORM. EVAL. CORING					
EQUIPMENT FAILURE AND REPAIR	2.0	0.25			
Sum.			2.0	0.25	790.0
DOWNTIME PLUG AND ABANDONMENT					
EQUIPMENT FAILURE AND REPAIR	4.5	0.57			
OTHER	0.5	0.06			
Sum.			5.0	0.63	795.0
Reported time (100.0 % of well total 795.0 hours) :					795.0

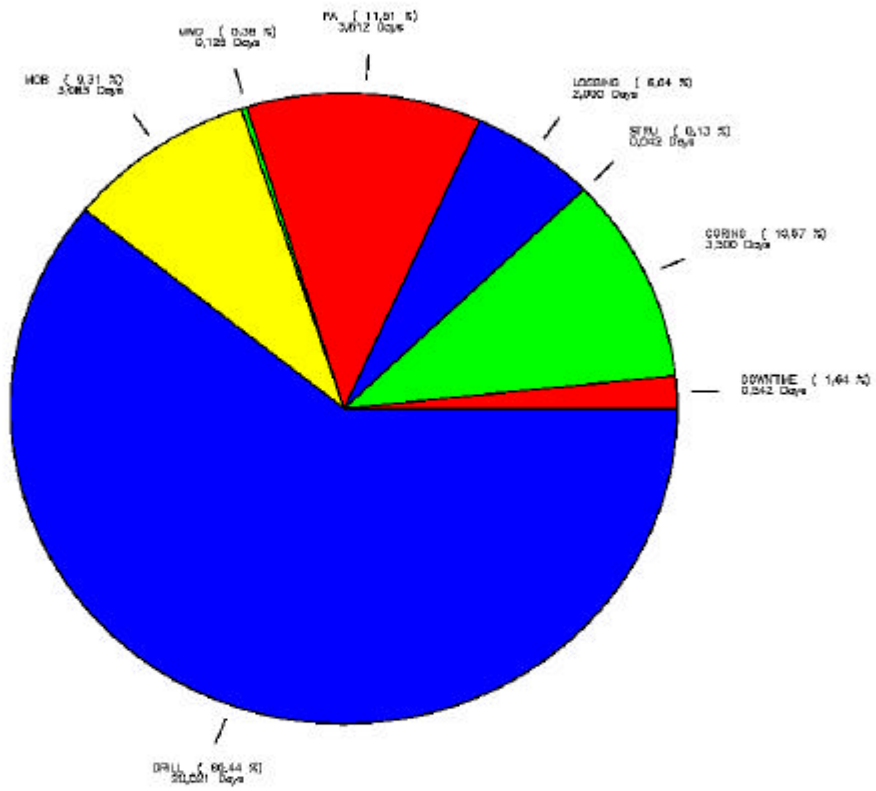
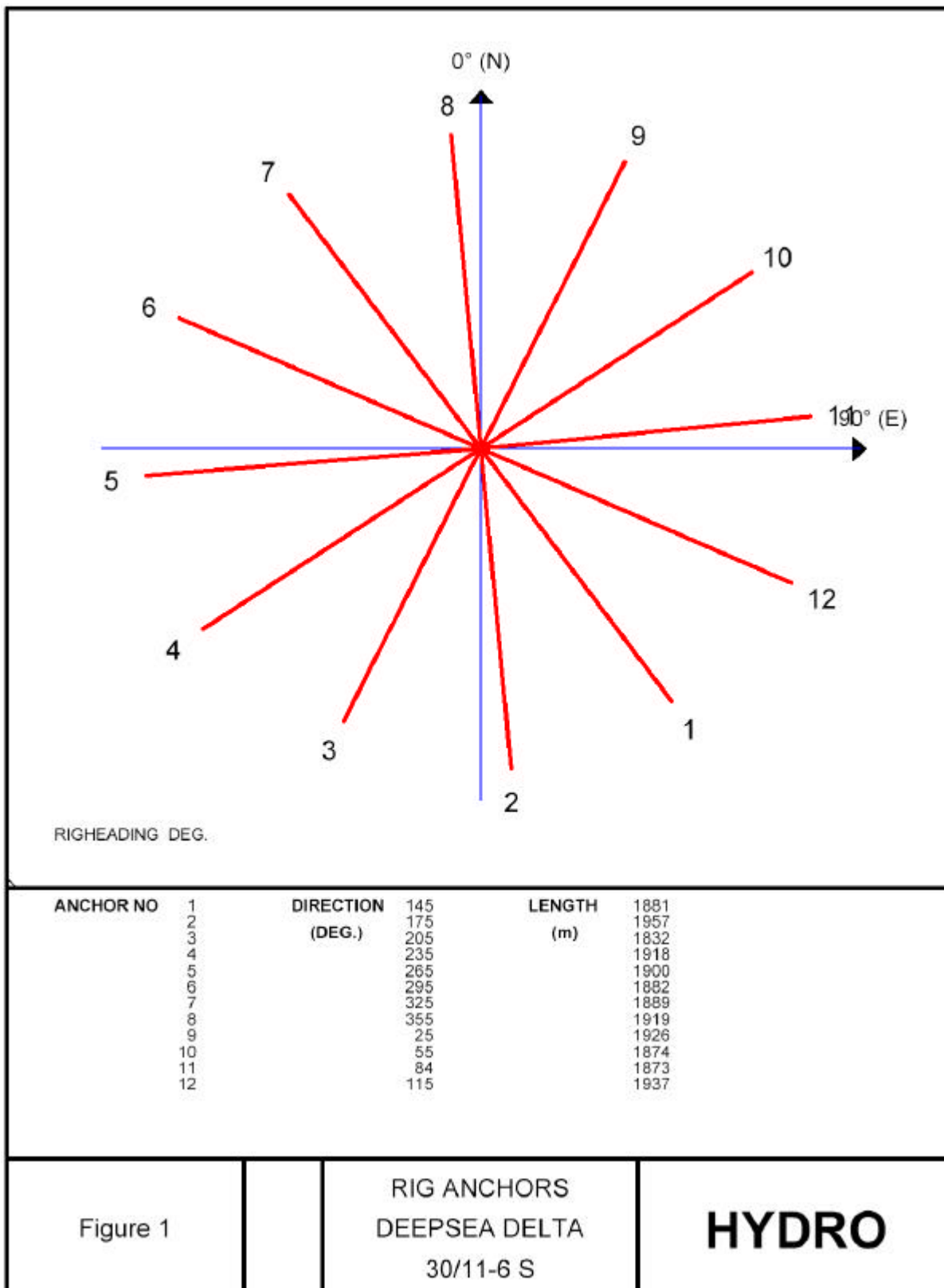


Figure 1	Time Distribution 30/11-6 S	HYDRO
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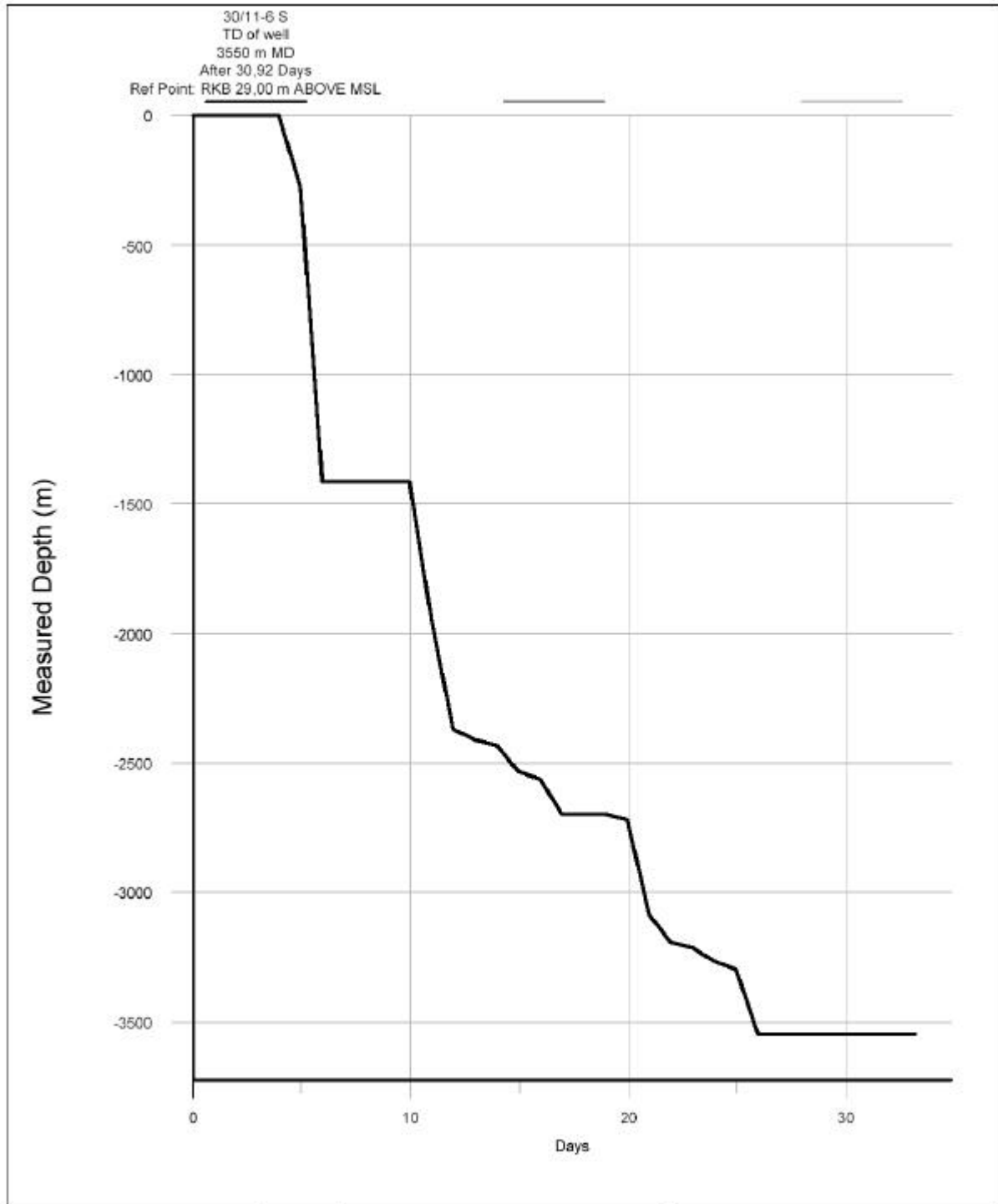
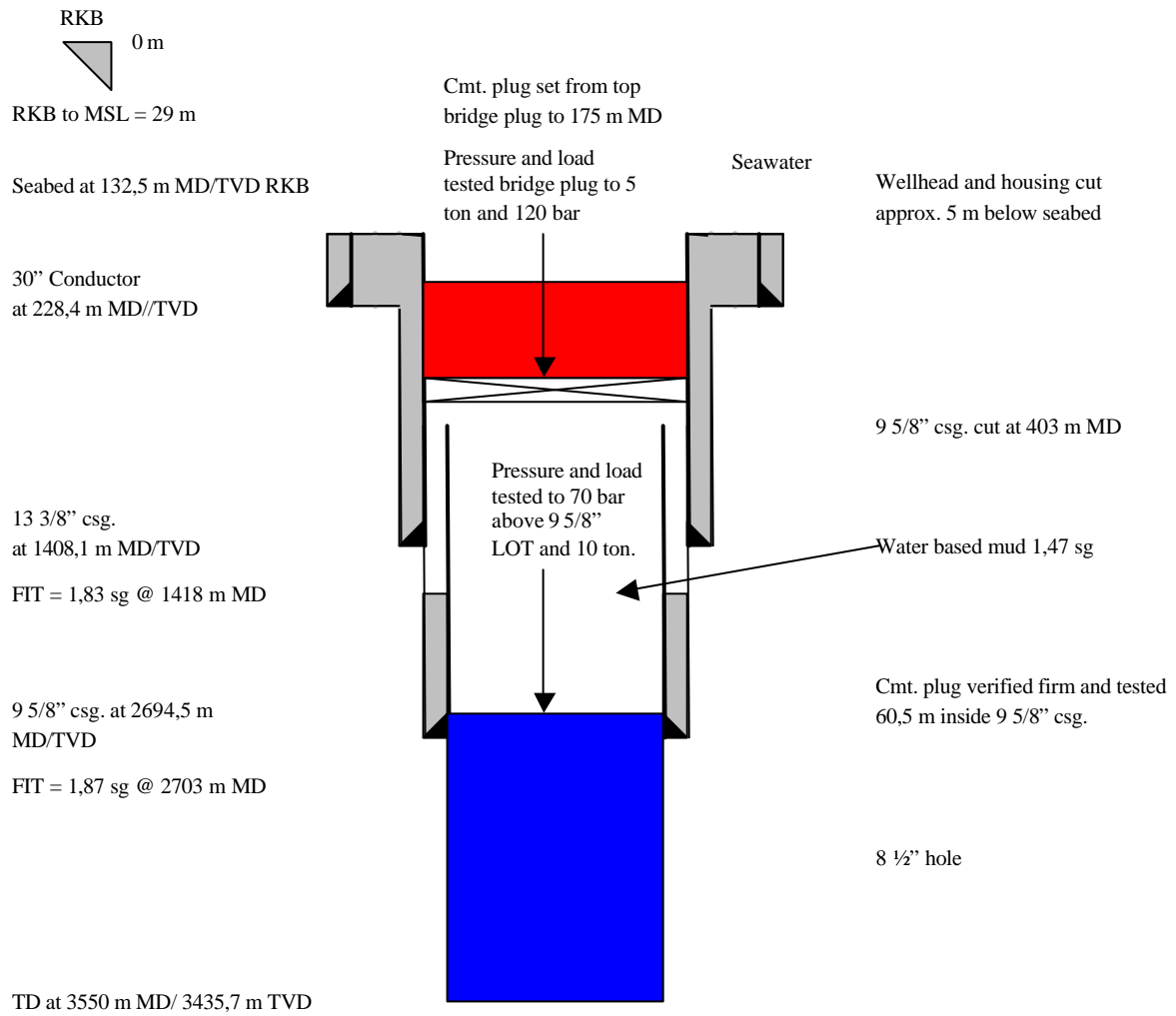


Figure 1

MD Drilling Curve

HYDRO



Well 30/11-6 S

Revision: 0

Permanent Plug and Abandonment

Final Well Report 30/11-6 S
Final Cost Reports Drilling and Completion

Section B-46

NORSK HYDRO A.S
DRILLING SECTOR

WELL: Brontes 30/11-6
LICENS: L272
RIG: Deepsea Delta
DEPTH:
RIG RATE: 14500 USD
EXCHANGE: USD 1.0 = Nkr 8
ACCOUNT: 900 901
EST. START:
DAYS PLANNED: 38

Date: 11.05.2004

EDI DESCRIPTION

			Pålept	Diff
EMPLOYEE RELATED				
0 COSTS		7 068 842	8 798 117	1 729 476
1 RIG COST		38 521 873	39 428 461	906 588
2 RIG SUPPORT / REIMB.		1 387 004	1 128 065	-260 939
3A FUEL/LUB	2 307 045		1 630 000	
3C BITS	1 445 760		1 035 165	
CASING/CASING				
3D EQUIPMENT	3 687 378		4 568 990	
3E WELLHEAD / X-MAS TREE	653 951		628 259	
CEMENT/CEMENT				
3F ADDITIVES	534 217		1 274 240	
3G MUD & MUD CHEMICALS	2 403 433		3 287 801	
CONSUMABLES COSTS,				
3 SUB TOTAL		11 031 785	12 424 455	1 392 670
4C OTHER TRANSPORTATION	0		276 587	
4D STANDBY VESSEL	1 520 000		2 037 616	
4F HELICOPTER TRANSPORT	2 394 000		1 722 646	
4G SUPPLY VESSELS	9 040 000		9 854 995	
TRANSPORTATION COSTS,				
4 SUB TOTAL		12 954 000	13 891 844	937 844
5A CORING	1 245 608		34 000	
5B DRILLING TOOLS	256 035		1 987 068	
5C CUTTING OF CASING	398 964		206 278	
5D COMPLETION COST			532 217	
5F MWD-SERVICES	2 149 188		1 773 022	
5G CASING OPERATIONS	401 041		57 847	
5H MUD LOGG. SERV & PERS.	976 388		1 420 557	
5I CEMENTING/PRESS.TEST	1 116 171		750 941	
EL. LOGGING (specified in				
attachment 3)	10 205 572		5 947 969	
5J VSP	0			
5L PROD. TESTING	0			
5M DIVING/ROV	962 013		1 281 808	
5N RIGPOOL	1 900 000		1 569 371	
5O DIVERSE	1 242 586		1 451 700	
SERVICE COSTS, SUB				
5 TOTAL		20 853 861	17 022 778	-3 831 083
6A SITE SURVEY	0		1 748 549	
6B RIG MOVING/POSITIONING	190 900		257 112	
6C DRILLING SITE CLEAN UP	0			
SURVEY COSTS, SUB				
6 TOTAL		190 900	2 005 661	1 814 761
7 WAREHOUSE COSTS		2 280 000	2 148 897	-131 103
TOTAL OPERATION COSTS		94 288 065	96 846 278	2 558 213
CURRENCY IMPACT		5 510 979	5 200 000	
TOTAL OPERATION COSTS INKL. CI		99 799 044	102 046 278	