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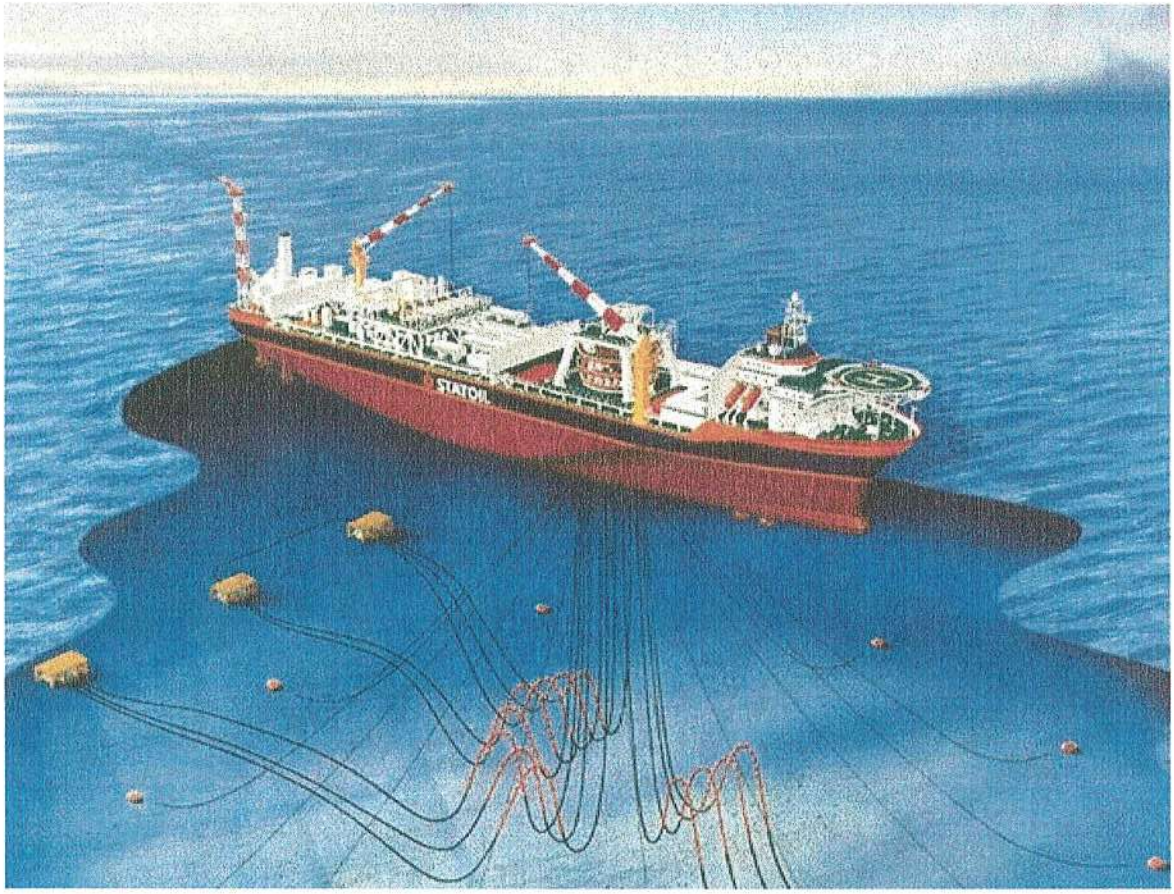
NORNE



Geological and Petrophysical Report
Norne Field
PL 128
Wells 6608/10-B-4 AH and BH
NOR-2002-06R

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PL 128
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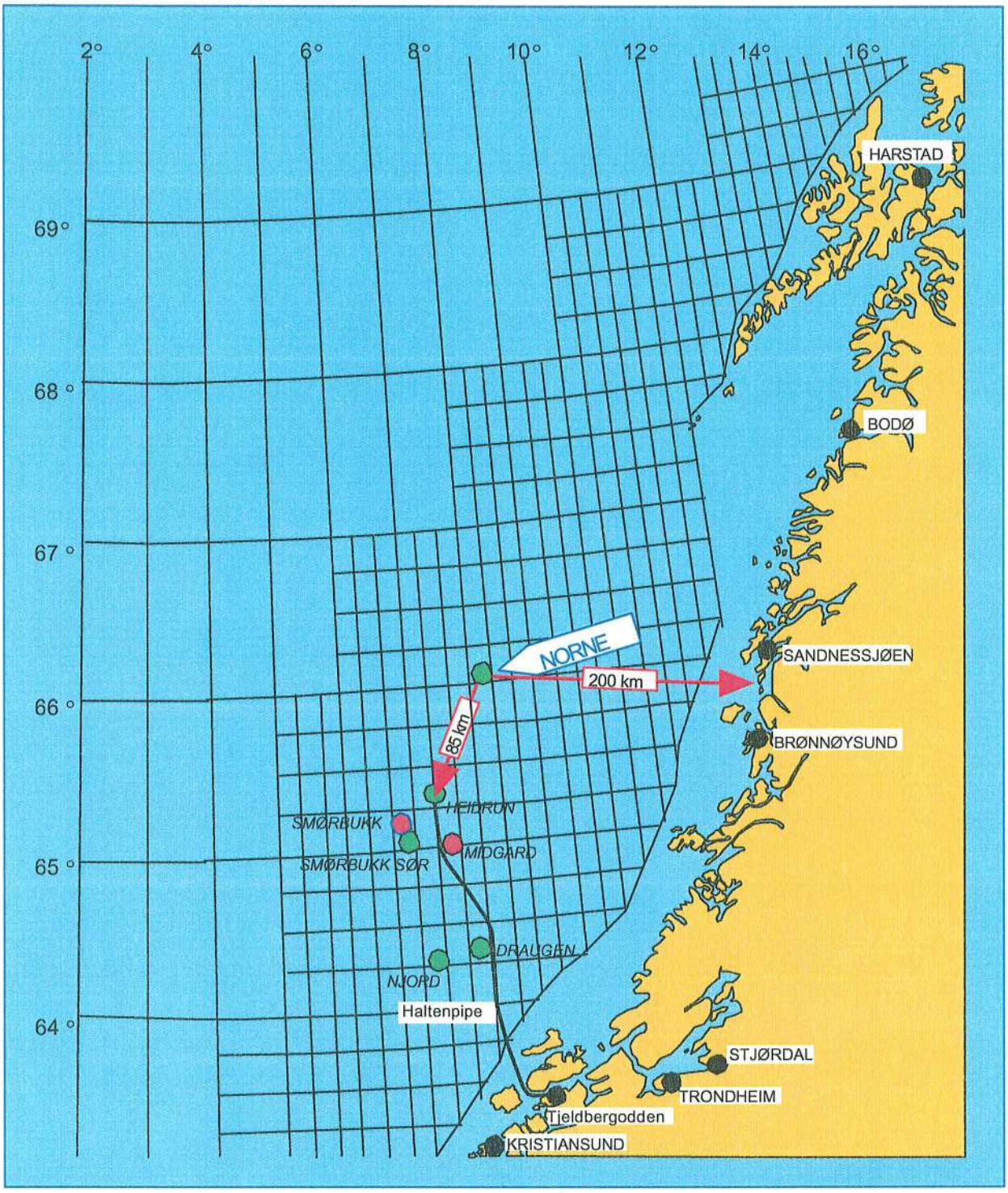
Enclosures


2°
4°
6°
8°
10°
12°
14°
16°
69°
68 °
67 °
66 °
65 °
64 °
HARSTAD
BODØ
SANDNESSJØEN
BRØNNØYSUND
STJØRDAL
TRONDHEIM
Tjeldbergodden
KRISTIANSUND
Haltenpipe
NORNE
200 km
85 km
HEIDRUN
SMØRBUKK
SMØRBUKK SØR
MIDGARD
DRAUGEN
NJORD

1 Summary

The objective of well 6608/10-B-4 AH was as a pilot hole for well 6608/10-B-4 BH. This pilot hole gave information about the present OWC and depths to different formation tops in the D-segment, information vital for an exact placement of well 6608/10-B-4BH. It also added to a better understanding of the pressure balance and regimes in the D-segment by means of MDT pressure testing. Another objective of the 12 ¼" section was to land the wellpath in the target, easing the drilling of the 8 ½ " sections, and to ensure that at least 10m MD of good quality Garn Formation sandstone was available for perforating through the 9 5/8" liner. The pilot well 6608/10-B-4 AH met its objectives.
The primary objective of well 6608/10-B-4 BH was to drill a horizontal section of 600m within the Ile2 Formation. Data from the pilot well was used, attempting to place the horizontal section approximately 40m TVD over the present day OWC. The OWC was thougth to be penetrated at 2653m TVD MSL. The wellpath was landed at 2614m TVD MSL and a horizontal section of 483m MD in the upper parts of the Ile – 2 Formation was achieved. Later petrophysical evaluation of wireline logs show an OWC at 2678m TVD MSL. The well was perforated in Garn – 3 and Ile – 2 Formations and a gas lift valve was installed over the Garn perforations. The heal section of the well shall be available for perforating after gas has been produced from the top of the structure. The well is currently (Sep. 2001) producing oil from Ile-2 at a rate of 5100-5200 m^3/day, with a GOR of 106-108.
Both wells were logged with LWD. One wireline run in the pilot well, 6608/10-B-4 AH, to ensure high quality data and pressure points. Both 12 ¼" and 8 ½" sections were drilled with oil based mud, which ensured proper hole and thus data quality.

2 Drilling Results

2.1 12 ¼" section

The well was kicked off underneath the 13 3/8" casing in 6608/10-B-4 H
The motor assy performed good in the upper part of the section, following the wellpath nicely in the first bitrun. In the second bitrun, the well was accidentaly sidetracked on the low side at a ledge at 2020m MD. This gave a bad start for the steering of the rest of the section. The wellpath stayed on the low side of the plan for a long time. The formations were difficult to steer in, the motor kept stalling out, causing lost toolface. Slow steering as well, ROP of 5-10m/hr. Eventually, the wellpath came back on the plan track. Then after evaluating the steering so far and the wellpath ahead, the desicion was made to POOH and mobilize a 12 1/4" RSS. The used bit came out 3/16" undergauge, this migth explain some of the difficulties seen steering the last part. RIH with 12 1/4" PowerDrive BHA. Had some initial problems in setting the tool. Eventually, the tool performed well. The problems related to mud losses are commented upon in ch. 6.

2.2 8 ½" section 6608/10-B-4 AH

The section was drilled in one bitrun without any significant problems. Details are given in the section report.

2.3 8 ½" section 6608/10-B-4 BH

There were no major problems with steerability or ROP. At 90deg incl. the assembly had a tendence to build, and some adjustments had to be made in order to keep the wellpath in the Ile-2 Formation. Details are given in the section report.

3 Petrophysical Evaluation

3.1 General well and mud data

NORNE	6608/10-B-4 AH / BH	12.06.2001 – 18.07.2001
OPERATION TYPE	Measurement while drilling (MWD) / Electric Wireline (EWL)	
STATOIL ENGINEERS	D. Tuppen/ O. W. Lind	
LOGGING COMPANY	Sperry Sun (MWD) / Baker Hughes Inteq (MWD) / Schlumberger (EWL)	

LOGGING ENGINEERS	T.Z. Johansen, O. Lyngre, O. Fossli, M. Øksengård, P. Svenning, P. Haarberg (Sperry Sun) M. Aissoui, B. Boddy, G. Wattley (Schlumberger)

WELLDATA	
Well Type	Water Injector
Block	6608/10
Template Slot	B-4 H
Rig	Borgland Dolphin
UTM East	7 322 136.39 m N
UTM North	457 114.16 m E
Geo East	66° 00' 55.4733"
Geo North	08° 03' 16.3715"
RKB	31 m
Water Depth	376 m
Max Deviation	72.9° / 93.0°
@ Depth	2221 / 4436 m MD RKB
Avg Dev in Reservoir	~70° / ~88°
Avg Azim in Reservoir	~70° / ~70°
TD driller	3900 / 4346 m MD RKB
TD logger	Not tagged
Csg shoe Driller	3271.2 m MD RKB
Csg shoe Logger	3271.2 m MD RKB
Csg	9 5/8"

MUD DATA	
Type	CARBO SEA OBM
Density	1.30 g/cc
Funnel Viscosity	73 mPa s
Fluid Loss [HTHP]	2.2 ml
Salinity	95 700 mg/l
Barite	-
Other, Kcl	-
Ca++	-
Mg++	-
Oil /Water ratio	73 / 27
Solids	15.2 vol %
Rm	n/a
Rmf	n/a
Rmc	n/a

Bottomhole Temperature (From MDT)	
T [deg C]	101.3 DegC
Depth	3837 m MD RKB
Time	11.07.2001

Table I: General well and mud data

3.2 Logging Programme

Date		MWD				Interval m MD RT	
Start	Stop	Tool Combination	Company	Run	Bit size	Top	Bot
12-jun-2001	17-jun-2001	DIR-FE-NUKE	Sperry Sun	1	12.25	1257	2094
19-jun-2001	24-jun-2001	DIR-GR	Sperry Sun	2	12.25	2020	2884
25-jun-2001	29-jun-2001	DIR-FE-NUKE	Sperry Sun	3	12.25	2884	3280
3-jul-2001	06-jul-2001	DIR-FE-NUKE	Sperry Sun	4	8.5	3280	3900
12-jul-2001	15-jul-2001	DIR-FE-NUKE	Sperry Sun	5	8.5	3215	4091
15-jul-2001	18-jul-2001	DIR-FE-NUKE	Sperry Sun	6	8.5	4091	4347

Table II: Logging While Drilling runs

Date					Interval m MD RT	
Start	Stop	Tool Combination	Company	Bit size	Top	Bot
8-jul-2001	11-jul-2001	MDT-PEX-DSI-AIT-GR	Schlumberger	8.5 "	3164	3552
11-jul-2001	12-jul-2001	MDT-PEX-DSI-AIT-GR	Schlumberger	8.5 "	3515	3890

Table III: Wireline Logging runs

Spliced curve	Original curve	Depth interval [m MD RKB]	Comments
6608/10-B-4AH			
GR	SGRC	1307 – 3287	Sperry Sun MWD data
	GR	3287 – 3870	Schlumberger WL data
	SGRC	3870 – 3892.4	Sperry Sun MWD data
RT	SEDP	1307 – 3267	Sperry Sun MWD data
	RT	3274 – 3892.2	Sperry Sun MWD data
RHOB	SBD2	1320 – 3264.2	Sperry Sun MWD data
	RHOZ	3273 – 3867	Schlumberger WL data
	SBD2	3867 – 3919.6	Sperry Sun MWD data
NPHI	SPLF	1300 - 3272	Sperry Sun MWD data
	NPHI	3272 – 3870.5	Schlumberger WL data
	SPLF	3870.5 – 3919.6	Sperry Sun MWD data
6608/10-D-4 BH			
GR	SGRC	1307 – 4336.3	Sperry Sun MWD data
RT	SEDP	1307 – 4334	Sperry Sun MWD data
RS	SEXP	1307 – 4334	Sperry Sun MWD data
RHOB	SBD2	1320 – 4329.3	Sperry Sun MWD data
NPHI	SPLF	1300 – 4325.5	Sperry Sun MWD data

Table IV Log splice, OpenWorks database

Porosity calculations on Norne are based on the density log by using following equation:

$$\phi_{density} = \frac{\rho_{matrix} - \rho_{bulk}}{\rho_{matrix} - \rho_{fluid}}$$

This formula gives total porosity, based on correlation from helium core porosity from cored wells.

Table VII shows the parameters used for the equation. ρ_{fluid} is iterated from SXO, mudweight and salinity using the formula:

$$\rho_{fluid} = S_{XO} \cdot \rho_{formationwater} + (1 - S_{XO}) \cdot \rho_{mudfiltate}$$

Permeability was calculated from a log-linear correlation of porosity and permeability from the following equation:

$$K_{\log} = 10^{(a \cdot \phi_{density} + b)}$$

Water saturation is calculated using Archies equation. Rt is taken from the Sperry Sun Deep Phase Shift Resistivity from MWD log.

$$SW = \left(\frac{a}{(\phi_{density})^m} \cdot \frac{R_w}{R_t} \right)^{\left(\frac{1}{n}\right)}$$

The model used for the reservoir rock properties table is as follows:

a	1.0
m	1.84
n	2.2 for Garn 3, Ile 2, Tilje 1.84 for Garn 1,Garn 2, Not, Ile 3, Ile 1, Åre. 2.02 for Tofte
Rw	0.054 Ohmm at 98°C
Rt	Sperry Sun Deep Phase Shift Resistivity from MWD Schlumberger RT from AIT WL logging

Table V: Reservoir rock properties used in calculations

The oil-water contact has rised from orginal 2692.3 m TVD MSL to 2678 m TVD MSL. The gas-oil contact was observed at 2566 m TVD MSL.

Shale volume (VSH) is estimated from the minimum method, using the minimum og VSH from the GR-log and DensityNeutron based on clean sand and shale picks.

$$VSH = MIN\left\{\frac{NPHI_{env} - \phi \cdot H_f}{\phi_{shale}}, \frac{GR - GR_{\min}}{GR_{\max} - GR_{\min}}\right\}$$

Net sand is calculated from permeability and VSH cut-off. Following parameters are used:

Fluid	Permeability cut-off (mD)	Shale content cut-off (Frac.)
Gas	<0.1	>0.3
Oil/ Water	<1.0	>0.3

Table VI: Cut-off values

The petrophysical properties is slightly different from well C-4 H, but almost equal to the nearest well, F-3 H. Ile 1 and lower Tofte 3 and Tofte 2 seems to have lower porosity / permeability compared to C-4 H, but theses zones are equal to well F-3 H.

The initial oil-water contact was found at 2593 m TVD MSL. The discrepancy between log depth and official depth (2688.5 m TVD MSL) is due to depth error incurred during drilling.

The rise in the oil-water level to 2678 m TVD MSL gives a rise of 15 meters, which is less than the expected 30-40 meters rise. This indicate that the water-rise at Norne is more complex than expected.

The following water saturations and expected changes were found.

Formation	Initial water saturation (taken from well C-4 H) (frac.)	Watersaturation in well B-4 BH (frac.)	Different in water saturaion (frac.)	Comment
Tofte 2	0.40	0.44	0.04	OWC between Tofte 2 and Tofte 1.2
Tofte 1.2	0.24	0.52	-0.28	
Tofte 1.1	0.30	0.69	-0.39	

Table VII: Water saturations in flooded zones.

Residual oil saturation found from SCAL gives a saturation of 0.12, which indicate that Tofte 1 Formation is not fully flooded.

T

6608/10-B-4 AH

Zone	Fluid phase	A	M	N	GR MIN	GR MAX	PHIN SH	RHO MA	RHO FL	KA KLO GH	KB KLO GH	KA KLO GV	KB KLOG V
GARN3	Gas	1	1.84	2,20	60	150	0.5	2.67	0.23	-0.611	11.14	-0.823	11.04
GARN2	Gas	1	1.84	2,20	60	160	0.5	2.67	0.22	-3.518	21.69	-5.420	27.71
	Oil	1	1.84	2,20	60	160	0.5	2.67	0.83	-3.518	21.69	-5.420	27.71
GARN1	Oil	1	1.84	1,84	60	170	0.5	2.67	0.86	-3.518	21.69	-5.420	27.71
NOT	Oil	1	1.84	1,84	80	180	0.5	2.67	0.92	-3.518	21.69	-5.420	27.71
ILE3	Oil	1	1.84	1,84	50	150	0.5	2.67	0.81	-3.518	21.69	-6.281	32.13
ILE2	Oil	1	1.84	2,20	50	150	0.5	2.67	0.79	-0.898	13.43	-6.281	32.13
ILE1	Oil	1	1.84	1,84	50	150	0.5	2.67	0.81	-0.898	13.43	-6.281	32.13
TOFTE4	Oil	1	1.84	2,02	50	150	0.5	2.67	0.81	-2.026	15.99	-6.281	32.13
TOFTE3	Oil	1	1.84	2,02	50	130	0.5	2.65	0.80	-4.370	25.07	-6.281	32.13
TOFTE2	Oil	1	1.84	2,02	50	130	0.5	2.65	0.87	-4.370	25.07	-6.281	32.13
TOFTE1	Water	1	1.84	2,02	50	130	0.5	2.71	0.93	-2.536	19.49	-4.670	26.30
TILJE4	Water	1	1.84	2,20	50	140	0.5	2.67	0.98	-2.536	19.49	-4.670	26.30
TILJE3	Water	1	1.84	2,20	50	140	0.5	2.67	0.98	-1.946	16.44	-4.670	26.30
TILJE2	Water	1	1.84	2,20	50	140	0.5	2.67	1.0	-2.536	19.49	-4.670	26.30
TILJE1	Water	1	1.84	2,20	50	140	0.5	2.67	0.99	-2.536	19.49	-4.670	26.30
ÅRE	Water	1	1.84	2,20	NaN	NaN	0.5	2.67	NaN	-2.536	19.49	-4.670	26.30

6608/10-B-4 BH

Zone	Fluid phase	A	M	N	GR MIN	GR MAX	PHIN SH	RHO MA	RHO FL	KA KLO GH	KB KLO GH	KA KLO GV	KB KLOG V
GARN3	Gas	1	1.84	2,20	60	150	0.5	2.67	0.23	-0.611	11.14	-0.823	11.04
GARN2	Gas	1	1.84	2,20	60	160	0.5	2.67	0.22	-3.518	21.69	-5.420	27.71
T	Oil	1	1.84	2,20	60	160	0.5	2.67	0.83	-3.518	21.69	-5.420	27.71
GARN1	Oil	1	1.84	1,84	60	180	0.5	2.67	0.86	-3.518	21.69	-5.420	27.71
T NOT	Oil	1	1.84	1,84	60	160	0.4	2.67	0.92	-3.518	21.69	-5.420	27.71
ILE3	Oil	1	1.84	1,84	60	150	0.4	2.67	0.81	-3.518	21.69	-6.281	32.13
ILE2	Oil	1	1.84	2,20	60	150	0.4	2.67	0.79	-0.898	13.43	-6.281	32.13

Table VIII: Parameters used in petrophysical calculations

6608/10-B-4 AH

Formation	Top (m MD RKB)	Bot (m MD RKB)	Thic. (m)	Top (m TVD MSL)	Bot (m TVD MSL)	Isoc. (m)	NTG (frac.)	SW (frac.)	VSH (frac.)	Net Poro (frac.)	Net Arit. H. Perm (mD)
Garn3	3196.0	3231.0	35.0	2575.2	2586.9	11.8	0.989	0.133	0.165	0.240	214.6
Garn2	3231.0	3282.0	51.0	2586.9	2601.1	14.2	0.740	0.193	0.170	0.230	146.9
Garn1	3282.0	3328.5	46.5	2601.1	2611.7	10.5	0.668	0.308	0.287	0.196	9.8
Not	3328.5	3368.0	39.5	2611.7	2618.0	6.4	0.031	0.482	0.316	0.179	2.7
Ile3.2	3368.0	3464.0	96.0	2618.0	2630.4	12.3	0.881	0.212	0.142	0.238	98.3
Ile3.1	3464.0	3515.5	51.5	2630.4	2640.9	10.5	0.929	0.189	0.086	0.244	79.7
Ile2.2.2	3515.5	3551.0	35.5	2640.9	2649.7	8.8	0.986	0.119	0.052	0.276	802.5
Ile2.2.1	3551.0	3569.0	18.0	2649.7	2654.7	5.0	1.000	0.142	0.027	0.272	867.6
Ile2.1	3569.0	3590.5	21.5	2654.7	2661.0	6.3	1.000	0.167	0.042	0.283	937.7
Ile1	3590.5	3602.5	12.0	2661.0	2664.8	3.8	0.967	0.174	0.092	0.208	319.9
Tofte4	3602.5	3621.0	18.5	2664.8	2671.1	6.3	1.000	0.236	0.186	0.232	64.5
Tofte3.4.2	3621.0	3636.0	15.0	2671.1	2676.6	5.5	1.000	0.092	0.033	0.300	1621.3
Tofte3.4.1	3636.0	3649.5	13.5	2676.6	2681.9	5.3	1.000	0.093	0.050	0.291	941.9
Tofte3.3.2	3649.5	3657.0	7.5	2681.9	2684.9	3.0	1.000	0.123	0.050	0.278	414.4
Tofte3.3.1	3657.0	3671.0	14.0	2684.9	2690.6	5.7	0.956	0.162	0.078	0.263	215.7
Tofte3.2	3671.0	3692.5	21.5	2690.6	2700.3	9.7	1.000	0.229	0.093	0.260	149.4
Tofte3.1	3692.5	3700.0	7.5	2700.3	2703.7	3.4	1.000	0.320	0.120	0.243	57.8
Tofte2	3700.0	3710.5	10.5	2703.7	2709.0	5.2	0.976	0.441	0.125	0.224	42.1
Tofte1.2	3710.5	3731.5	21.0	2709.0	2719.6	10.6	0.929	0.516	0.034	0.262	1261.7
Tofte1.1	3731.5	3741.0	9.5	2719.6	2724.7	5.1	0.804	0.694	0.063	0.264	1160.3
Tilje4	3741.0	3758.0	17.0	2724.7	2733.8	9.2	0.823	0.823	0.200	0.201	271.0
Tilje3	3758.0	3796.0	38.0	2733.8	2756.9	23.0	0.842	0.873	0.079	0.246	486.9
Tilje2	3796.0	3850.5	54.5	2756.9	2792.5	35.6	0.579	0.911	0.210	0.188	182.0
Tilje1	3850.5	3888.0	37.5	2792.5	2818.8	26.3	0.811	0.915	0.050	0.259	961.0
Aare	3888.0	3900.0	12.0								

6608/10-B-4 BH

Formation	Top (m MD RKB)	Bot (m MD RKB)	Thic. (m)	Top (m TVD MSL)	Bot (m TVD MSL)	Isoc. (m)	NTG (frac.)	SW (frac.)	VSH (frac.)	Net Poro (frac.)	Net Arit. H. Perm (mD)
Garn3	3196.0	3231.0	35.0	2575.2	2586.9	11.8	0.995	0.137	0.166	0.228	204.1
Garn2	3231.0	3282.0	51.0	2586.9	2601.2	14.3	0.777	0.187	0.147	0.248	223.7
Garn1	3282.0	3328.5	46.5	2601.2	2612.4	11.2	0.317	0.260	0.319	0.232	78.3
Not	3328.5	3352.5	24.0	2612.4	2617.8	5.4	0.046	0.237	0.046	0.189	9.8
Ile3.2	3352.5	3564.5	212.0	2617.8	2635.1	17.3	0.939	0.185	0.052	0.260	262.2
Ile3.1	3564.5	3751.0	186.5	2635.1	2644.2	9.1	0.799	0.201	0.021	0.258	178.0
Ile2	3751.0	4347.0	596.0	2644.2	2647.1	2.9	0.941	0.105	0.008	0.294	1195.6

Table IX: Statistics for Petrophysical Evaluation

4 Stratigraphic Tops

Stratigraphic Top	Depth, m MD	Prognosis m TVD MSL	Actual, m TVD MSL	Difference, m TVD	UTM N	UTM E
6608/10-B-4 AH						
Kai Formation	1369,0	1319,0	1321,0	+2 m	7322166,5	456974,75
Brygge Formation	1618,0	1563,0	1559,8	-3,2 m	7322224,0	456940,6
Brygge Tuff Mbr	1700,5	1643,0	1637,2	-5,8 m	7322252,0	456938,25
Tare Formation	1912,5	1823,0	1824,5	+1,5 m	7322351,0	456942,5
Tang Formation	1977,5	1880,0	1878,9	-1,1 m	7322385,0	456951,88
Springar Formation	2025,0	1911,0	1917,6	+6,6 m	7322411,5	456959,88
Lyr Formation	2816,0	2371,0	2375,8	+4,8 m	7322956,5	457271,31
Spekk Formation	2857,0	2407,0	2395,4	-11,6 m	7322984,5	457294,16
Melke Formation	2860,0	2420,0	2396,9	-23,1 m	7322986,5	457295,88
Garn - 3	3196,0	2553,0	2544,2	-8,8 m	7323160,5	457539,78
Garn - 2	3231,0	2561,0	2555,9	-5,1 m	7323175,5	457569,13
Garn - 1	3282,0	2572,0	2570,1	-1,9 m	7323196,0	457613,66
Not Formation	3328,0	2582,0	2580,6	-1,4 m	7323213,0	457655,63
Ile - 3	3368,0	2588,0	2587,0	-1 m	7323226,5	457692,13
Ile - 2	3569,0	2605,0	2609,9	+4,9 m	7323291,0	457878,38
Ile - 1	3590,5	2615,0	2630,0	+15 m	7323299,5	457897,19
Tofte - 4	3602,5	2618,0	2633,8	+15,8 m	7323304,0	457907,47
Tofte - 3	3671,0	2625,0	2640,1	+15,1 m	7323331,0	457964,81
Tofte - 2	3700,0	2649,0	2672,7	+23,7 m	7323341,5	457988,5
Tofte - 1	3710,5	2654,0	2677,9	+23,9 m	7323345,0	457996,91
Tilje - 4	3741,0	2667,0	2693,6	+26,6 m	7323355,0	458021,10
Tilje - 3	3758,0	2677,0	2702,8	+25,8 m	7323360,5	458034,38
Tilje - 2	3796,0	2695,0	2725,8	+30,8 m	7323371,0	458062,59
Tilje - 1	3850,0	2728,0	2761,5	+33,5 m	7323384,5	458101,47
Åre Formation	3888,0	2755,0	2787,8	+32,8 m	7323392,5	458126,94
TD	3900,0	N/A	2796,4	N/A	7232395,0	458134,91
6608/10-B-4 BH						
Ile - 2	3750,0	2605,0	2614,0	+9 m		
TD	4346,0	2600,0	2615,9	N/A	7323548,21	458613,51

5 Geological Summary

5.1 Nordland Group to Rogaland Group

The Nordland, Hordaland and Rogaland Groups were drilled before the geologists arrived at the rig. Please refer to BHI's mudlogging report for lithological descriptions.

5.2 Shetland Group

Springar Formation

The Springar Formation consists of claystone with limestone stringers.

The claystone varies between medium dark grey to dark grey and greenish grey. It is mostly firm, blocky to subblocky in shape, non to sligthly calcareous, and with traces of pyrite and glauconite.
The limestone is brownish grey to white to yellowish brown. It is mostly firm, blocky and argillaceous

5.3 Cromer Knoll Group

Lyr Formation

The Lyr Formation is recognized by a marked decrease in GR readings and corresponding increase in resistivity readings compared to the Springar Formation

The Lyr Formation consists predominantly of claystone with some limestone and siltstone stringers.

The claystone varies from medium grey, dark grey to greenish grey. It is soft to firm and varies from blocky to subblocky in shape. Mostly non calcareous.

The limestone varies from mostly medium brownish gray to white and yellowish brown. It is firm to hard in hardness and mostly blocky to subblocky in shape.

The siltstone varies from dark yellowish brown to dark grey.

5.4 Viking Group

Spekk Formation

The Spekk Formation is recognized by a sharp increase in GR readings, up to 220-230API. The GR readings stay high throughout the thin Spekk Formation.

Melke Formation

The Melke Formation is recognized by a decrease in GR readings from what seen in the Spekk Formation. Still, the GR readings are at least 1 decimal of the scale (15 API) higher than what seen in the Springar and Lyr Formations.

The claystone is dark grey to greenish grey, firm, subblocky to blocky, sligthly calcareous, silty with traces of limestone and dolomite.

The limestone is moderately brownish white with occational black specks. It is occationally white or yellowish brown, blocky, firm and argillaceous.

The sandstone is dark yellow to ligth brown with loose quartz grains in silty clay matrix. The grains are well to moderately sorted, very fine to coarse, subangular to subrounded and generally moderately sorted.

5.5 Fangst Group

The Fangst Group in this section is represented by the Garn Formation. It is recognized by a sharp decrease to low GR readings coinciding with high resistivity readings and a dens/neut crossover representing gas filled clean sandstones.

Garn Formation

The Garn Fm is a coarsening upward sequence which is initiated from the top of the Not Fm. The boundary between the Garn and the Not Fm is diffuse and is picked by the first appearence of silty sand layers.

The sandstone consists of clear to light brownish quartz grains, in places in a light grey calcite matrix. The grains are very fine to medium sized, well sorted, subangular to subrounded. The sandstone often grades to siltstone which is medium grey to grey, soft to firm, subblocky, micropyritic and slightly calcareous.

The claystone is moderately to dark grey, firm, blocky, calcareous.

The limestone is ligth grey to grey, firm to hard, blocky, microcrystalline and argillaceous.

Not Formation

The claystone is moderate to dark brownish grey, firm to moderately hard, blocky to platy. It contains calcite rich zones, traces of mica and carbonaceous materias. It is silty in places.

Ile Formation

The Ile Formation consists of sandstone with occasional limestone and claystone interbeds The sandstone consists of clear to light brown transparent quartz grains with a very fine to fine grainsize. The grains are moderately to well sorted, subrounded in most samples. The sandstone varies from loose to firm blocks and lumps. Calcite cementation is seen in some

samples, as is a moderate grey clay matrix. Silica cement is also occasionally observed generating hard aggregates. Traces of mica, pyrite and glauconite is seen on occasions.

The claystone is varicolored, grey, brownish grey and brownish black. Claystone fragments are blocky to platy, firm, in places hard and in places crumbly. The claystone is calcareous. It contains traces of mica, pyrite and glauconite. Silty developments are seen throughout the samples.

The limestone is grey to bluish grey. On occations brownish fragments are seen. The limestone is firm to hard, microcrystalline and argillaceous.

5.6 Båt Group

The Båt Group is represented by the Tofte, Tilje and Åre Formations in B-4AH. TD in B-4AH is set in the top of the Åre Fm. The Båt Group is not represented in B-4BH.

Tofte Formation

The Tofte Formation consists of sandstone and claystone interbeds with occasional limestone The sandstone consists of light grey to clear quartz grains in a grey clay matrix. Large amounts of calcite cementation is seen in some of the samples. The grains are fine to medium sized and moderately to well sorted. There is often an abundance of loose clear fine to medium quartz grains seen in the samples.

The claystone is moderately to dark brownish grey, firm, platy occationally blocky. It contains calcite and traces if mica, silt and sand

The limestone is light grey to blue grey, brown grey on occasions. It is crumbly to firm, hard in places, microcrystalline and locally sacroidal. The limestone is locally very arenaceous and argillaceous grading to cemented sandstones og marly clays.

Tilje Formation.

The Tilje Fm consists of sandstone and claystone interbeds with occasional limestone stringers. Occasionally highly carbonaceous layers are observed. These are thin and rarely developed into coal.

The sandstone consists of moderately grey, brownish grey to transparent quartz grains. The grains are very fine to medium and occasionally coarse to very coarse. The sand is moderately sorted, subangular to angular and situated in a light grey clay matrix. Loose clear to translucent quartz grains are frequently observed in the samples.

The claystone is moderately to dark greenish grey, with local traces of bluish grey layers. It is blocky to platy, dominantly non calcareous but with local occurrences of calcite. Micropyrite and pyritic nodules were also observed in the samples.

The limestone is ligth grey to bluish grey, brown grey on occations. It is firm, hard in places, microcrystalline and laminated. The limestone is locally very arenaceous and argillaceous grading to cemented sandstones og marly clays.

Only a small interval of the Åre Formation were penetrated by the B-4AH wellbore, not enough for a lithological description.

6 Pore Pressure and Hole Stability

6.1 Pore Pressure

6.1.1 12 ¼" section

The direct observations in the well shows the pore pressure of the drilled sequence to be significantly lower than 1,47 sg EMW, the lowest mudweigth used when drilling the section. Calculations and observations indicate hydrostatic pressure down to 1420m TVD RT , in the middle of the Naust formation, a slow pressure increase down to 1470 m TVD RT, then a rapid pressure increase to 1,17 sg EMW at top of the Brygge Formation (1597m TVD RT). A rapid pressure increase from 1,17 - 1,35sg EMW is inferred from 1597 - 1800m TVD RT in the Brygge Formation, followed by a slower increase to the interpreted pressure maximum , 1,39sg EMW at 1950m TVD RT, the base of the Tang Formation. Pressure prediction in the lower parts of the Springar Formation is difficult. The gas data and parameter trends suggest a rapid pressure decrease beneath the maximum pressure at 2000m TVD RT, down to a pore pressure of 1,30sg EMW at 2060m TVD RT and 1,16sg EMW at 2350m TVD RT. The pore pressure gradient in the lower parts of the Springar Formation, the Lyr- and Melke Formation is interpreted to decrease, meeting the initial hydrostatic pressure on the top of the middle Jurassic Fangst Group. Pore pressure calculations support this interpretation.

6.1.2 8 ½" section 6608/10-B-4AH

The following pore pressures in the reservoir section were measured by the MDT-logging :

Formation	Depth interval m TVD MSL	Measured pressure	Equivalent mudweigth
Garn-1	2575-2577	278 bar	1,09 sg (from RT)
Ile	2588-2630	237-242 bar	0,93 sg (from RT)

Tofte 4-2	2630-2676	242-249 bar	0,93 sg (from RT)
Tofte-1	2676-2692	249 bar	0,93 sg (from RT)
Tilje-4	2692-2700	251 bar	0,94 sg (from RT)
Tilje-3	2700-2722	257-259 bar	0,96 sg (from RT)
Tilje-2	2722-2735 (lowest MDT)	268 bar	0,99 sg (from RT)

The initial pore pressure in the reservoir is 273,2 bar at 2639 m TVD MSL. RT is 31m aMSL. The pore pressure in the 8 ½" section in 6608/10-B-4BH are interpreted to be equal to the measured pressure in the pilot hole.

6.2 Formation Strength/Mud Losses

6.2.1 12 ¼" section

A FIT to 1,70 sg EMW were performed after kicking off from the B-4H wellpath at 1352m MD. Mud losses were reported after taking a connection at 2089m MD. Drilled further, 4m, and lost returns immediately. Approximately 393m^3 were lost the next 24hrs when trying to stabilize well. Minor (<15m3) losses were experienced twice later when passing the shoe area. The observed fracture pressure in B-4 AH is consistent with the observations in the XLOT in Well 6608/10-7 (Svale 2). This test had a formation breakdown pressure at 1.94 sg (1st cycle), a fracture reopening pressure at 1.56 sg (2nd cycle), fracture propagation pressures of 1.60 sg / 1.56 sg (1st / 2nd cycle) and a fracture closure pressure in the range 1.46 sg - 1.50 sg, with 1.49 sg as the most probable value. The data from the MWD pressure sensors indicate that the fracture in Well 6608/10-B-4 AH appears to have been initiated at 1.71 sg (fracture breakdown), and has shown reopening and propagation at 1.56 sg (initially, just after initiation) and eventually at pressures as low as 1.49 sg (during the cement squeeze) and 1.50 + sg (in the failed attempt to increase the mud density to 1.50 sg)

6.2.2 8 ½" sections, 6608/10-B-4AH and -BH

No FIT or LOT were performed. The PWD recording of 1,52sg from the TD of the 12 1/4" section was used as the basis for formation integrity. No loss zones observed in the 8 ½" sections.

6.3 Hole Stability

There were small amounts of cavings in the 12 ¼" section during bitruns #2 and #3, after lowering the mudweigth. They seem to originate from the Tang- and Springar Formations. The amount of cavings seen in this well do not indicate hole stability problems. It is worth noting that parts of this section was drilled with significantly lower mudweigth than previous 12 ¼" sections on the Norne Field. No indications of hole instability in the 8 ½" sections.

App A Final Directional Survey

Statoil,Slot #4
Norne B,6608/10
NORNE,Norway

Wellbore: B-4 AH
Wellpath: B-4 AH Definitive
(TD@3900) Prelim
Date Printed: 20-Feb-2002

STATOIL

Wellbore

Name	Created	Last Revised
B-4 AH	1-Feb-2002	1-Feb-2002

Well

Name	Government ID	Last Revised
6608/10-B-4 AH		1-Feb-2002

Slot

Name	Grid Northing	Grid Easting	Latitude	Longitude	North	East
Slot #4	7322136.3874	457114.1614	N66 0 55.4733	E8 3 16.3715	6.99N	3.64W

Installation

Name	Easting	Northing	Coord System Name	North Alignment
Norne B	457117.800	7322129.400	ED50-UTM-32N on EUROPEAN DATUM 1950 datum	Grid

Field

Name	Easting	Northing	Coord System Name	North Alignment
NORNE	458667.000	7323438.000	ED50-UTM-32N on EUROPEAN DATUM 1950 datum	Grid

Created By

Comments

All data is in Metres unless otherwise stated
Coordinates are from Installation MD's are from Rig and TVD's are from Rig (Borgland Dolphin 31.0m above Mean Sea Level)
Vertical Section is from 6.99N 3.64W on azimuth 75.00 degrees
Bottom hole distance is 1624.65 Metres on azimuth 39.03 degrees from Wellhead
Calculation method uses Minimum Curvature method
Prepared by Statoil

Statoil,Slot #4
Norne B,6608/10
NORNE,Norway

Wellbore: B-4 AH
Wellpath: B-4 AH Definitive
(TD@3900) Prelim
Date Printed: 20-Feb-2002

STATOIL

Wellpath Report

MD[m]	Inc[deg]	Dir[deg]	TVD[m]	North[m]	East[m]	Dogleg [deg/30m]	Vertical Section[m]
402.70	0.00	0.00	402.70	6.99N	3.64W	0.00	0.00
1320.00	14.31	288.97	1304.70	34.60N	130.66W	0.47	-115.54
1330.00	13.72	293.58	1314.41	35.47N	132.91W	3.79	-117.50
1340.00	13.66	297.80	1324.12	36.50N	135.04W	3.00	-119.29
1350.00	13.86	299.87	1333.84	37.65N	137.13W	1.59	-121.00
1360.00	14.41	301.34	1343.53	38.89N	139.23W	1.97	-122.71
1370.00	14.97	301.72	1353.21	40.22N	141.39W	1.70	-124.46
1380.00	15.57	303.22	1362.85	41.63N	143.61W	2.15	-126.24
1390.00	15.98	304.24	1372.48	43.14N	145.87W	1.48	-128.03
1400.00	16.63	305.66	1382.08	44.75N	148.17W	2.29	-129.83
1410.00	17.24	307.90	1391.64	46.49N	150.51W	2.68	-131.64
1420.00	17.51	309.45	1401.18	48.36N	152.84W	1.61	-133.40
1430.00	17.67	312.28	1410.72	50.34N	155.12W	2.61	-135.10
1440.00	17.81	314.80	1420.24	52.44N	157.33W	2.34	-136.69
1450.00	17.73	316.97	1429.77	54.63N	159.45W	2.00	-138.17
1460.00	17.41	319.48	1439.30	56.88N	161.46W	2.47	-139.53
1470.00	17.18	322.27	1448.85	59.18N	163.34W	2.58	-140.75
1480.00	16.96	325.35	1458.41	61.55N	165.07W	2.79	-141.81
1490.00	16.48	327.80	1467.98	63.95N	166.66W	2.56	-142.72
1500.00	15.87	331.53	1477.59	66.35N	168.07W	3.61	-143.46
1510.00	15.48	334.93	1487.22	68.76N	169.28W	2.99	-144.01
1520.00	15.34	337.95	1496.86	71.20N	170.34W	2.44	-144.41
1530.00	15.29	340.09	1506.50	73.66N	171.29W	1.70	-144.68
1540.00	15.20	342.88	1516.15	76.16N	172.13W	2.22	-144.84
1550.00	15.15	346.71	1525.80	78.68N	172.81W	3.01	-144.85
1560.00	15.43	348.95	1535.45	81.26N	173.37W	1.96	-144.72
1570.00	15.70	351.08	1545.08	83.90N	173.83W	1.90	-144.49
1580.00	16.35	353.38	1554.69	86.64N	174.20W	2.73	-144.14
1590.00	16.61	353.79	1564.28	89.45N	174.52W	0.85	-143.71
1600.00	16.91	353.94	1573.86	92.32N	174.83W	0.91	-143.27
1610.00	17.46	354.37	1583.41	95.26N	175.13W	1.69	-142.80
1620.00	18.12	354.59	1592.93	98.30N	175.42W	1.99	-142.30
1630.00	18.52	354.92	1602.43	101.43N	175.71W	1.24	-141.76
1640.00	19.09	355.40	1611.89	104.64N	175.98W	1.77	-141.19
1650.00	19.44	355.56	1621.33	107.93N	176.24W	1.06	-140.59
1660.00	20.08	355.45	1630.74	111.30N	176.51W	1.92	-139.98
1670.00	20.66	355.32	1640.12	114.77N	176.79W	1.75	-139.35
1680.00	21.11	355.12	1649.46	118.33N	177.08W	1.37	-138.72
1690.00	21.89	355.42	1658.77	121.98N	177.39W	2.36	-138.07
1700.00	23.13	356.52	1668.00	125.80N	177.65W	3.93	-137.34
1710.00	23.59	356.55	1677.18	129.75N	177.89W	1.38	-136.54
1720.00	24.59	356.16	1686.31	133.83N	178.15W	3.04	-135.74
1730.00	25.91	356.76	1695.36	138.09N	178.42W	4.03	-134.89
1740.00	26.61	357.01	1704.32	142.50N	178.66W	2.13	-133.98
1750.00	27.20	357.48	1713.24	147.02N	178.87W	1.88	-133.02
1760.00	27.54	357.85	1722.12	151.62N	179.06W	1.14	-132.01
1770.00	27.75	358.18	1730.98	156.25N	179.22W	0.78	-130.97
1780.00	27.88	358.81	1739.83	160.92N	179.35W	0.96	-129.88
1790.00	27.94	359.52	1748.66	165.60N	179.41W	1.01	-128.73
1800.00	27.67	0.10	1757.51	170.26N	179.43W	1.15	-127.54
1810.00	27.41	1.53	1766.38	174.89N	179.36W	2.13	-126.28
1820.00	27.46	2.94	1775.25	179.49N	179.18W	1.95	-124.92
1830.00	27.84	4.12	1784.11	184.12N	178.90W	2.00	-123.44
1840.00	28.40	4.60	1792.93	188.82N	178.54W	1.81	-121.88
1850.00	28.94	4.95	1801.70	193.60N	178.14W	1.70	-120.25
1860.00	29.48	6.03	1810.43	198.46N	177.67W	2.26	-118.55
1870.00	30.02	6.93	1819.11	203.39N	177.11W	2.10	-116.73

All data is in Metres unless otherwise stated
Coordinates are from Installation MD's are from Rig and TVD's are from Rig (Borgland Dolphin 31.0m above Mean Sea Level)
Vertical Section is from 6.99N 3.64W on azimuth 75.00 degrees
Bottom hole distance is 1624.65 Metres on azimuth 39.03 degrees from Wellhead
Calculation method uses Minimum Curvature method
Prepared by Statoil

Statoil,Slot #4
Norne B,6608/10
NORNE,Norway

Wellbore: B-4 AH
Wellpath: B-4 AH Definitive
(TD@3900) Prelim
Date Printed: 20-Feb-2002

STATOIL

Wellpath Report

MD[m]	Inc[deg]	Dir[deg]	TVD[m]	North[m]	East[m]	Dogleg [deg/30m]	Vertical Section[m]
1880.00	30.14	7.93	1827.77	208.36N	176.46W	1.55	-114.82
1890.00	30.11	9.59	1836.42	213.32N	175.70W	2.50	-112.79
1900.00	30.71	11.40	1845.04	218.30N	174.78W	3.29	-110.62
1910.00	31.16	12.86	1853.62	223.32N	173.70W	2.63	-108.27
1920.00	31.54	13.61	1862.16	228.38N	172.51W	1.63	-105.81
1930.00	32.13	14.82	1870.65	233.50N	171.21W	2.61	-103.23
1940.00	32.71	15.53	1879.09	238.67N	169.81W	2.08	-100.54
1950.00	33.55	15.73	1887.47	243.94N	168.33W	2.54	-97.76
1960.00	34.34	16.08	1895.76	249.31N	166.80W	2.44	-94.89
1970.00	34.54	16.24	1904.01	254.74N	165.23W	0.66	-91.96
1980.00	34.51	16.77	1912.25	260.17N	163.62W	0.91	-89.00
1990.00	34.89	16.91	1920.47	265.62N	161.97W	1.16	-86.00
2000.00	35.46	17.06	1928.65	271.13N	160.29W	1.73	-82.94
2010.00	35.97	16.87	1936.77	276.71N	158.58W	1.57	-79.85
2020.00	36.20	16.77	1944.85	282.35N	156.88W	0.71	-76.75
2030.00	35.96	16.66	1952.93	287.99N	155.19W	0.75	-73.65
2040.00	35.60	16.65	1961.04	293.59N	153.51W	1.08	-70.58
2050.00	35.60	16.58	1969.17	299.17N	151.84W	0.12	-67.53
2060.00	35.49	16.99	1977.31	304.74N	150.17W	0.79	-64.47
2070.00	35.53	16.95	1985.45	310.29N	148.47W	0.14	-61.40
2080.00	35.85	16.98	1993.57	315.87N	146.77W	0.96	-58.31
2090.00	36.91	16.99	2001.62	321.55N	145.04W	3.18	-55.16
2100.00	38.00	17.26	2009.56	327.36N	143.25W	3.31	-51.93
2110.00	38.69	17.95	2017.40	333.27N	141.37W	2.44	-48.59
2120.00	39.22	18.37	2025.18	339.24N	139.41W	1.78	-45.15
2130.00	39.69	19.31	2032.90	345.26N	137.36W	2.28	-41.61
2140.00	40.55	19.93	2040.55	351.33N	135.19W	2.84	-37.95
2150.00	41.91	20.10	2048.07	357.52N	132.94W	4.09	-34.17
2160.00	42.92	20.50	2055.45	363.85N	130.60W	3.14	-30.27
2170.00	43.89	20.62	2062.72	370.28N	128.18W	2.92	-26.27
2180.00	45.37	20.62	2069.83	376.85N	125.71W	4.44	-22.18
2190.00	45.37	19.80	2076.86	383.53N	123.25W	1.75	-18.08
2200.00	45.78	19.85	2083.86	390.25N	120.83W	1.23	-14.00
2210.00	46.42	20.01	2090.79	397.02N	118.37W	1.95	-9.87
2220.00	47.73	20.19	2097.60	403.90N	115.86W	3.95	-5.66
2230.00	49.34	20.12	2104.22	410.94N	113.27W	4.83	-1.35
2240.00	50.66	20.03	2110.65	418.13N	110.64W	3.97	3.05
2250.00	51.39	20.15	2116.94	425.43N	107.97W	2.21	7.52
2260.00	52.03	20.28	2123.14	432.80N	105.26W	1.94	12.05
2270.00	52.46	20.85	2129.26	440.20N	102.48W	1.87	16.65
2280.00	52.82	21.35	2135.33	447.62N	99.62W	1.61	21.33
2290.00	53.38	22.26	2141.33	455.04N	96.65W	2.75	26.12
2300.00	54.54	22.94	2147.22	462.50N	93.55W	3.85	31.05
2310.00	56.01	23.22	2152.91	470.07N	90.32W	4.46	36.12
2320.00	56.75	23.35	2158.45	477.71N	87.03W	2.24	41.28
2330.00	57.14	23.66	2163.90	485.40N	83.69W	1.41	46.50
2340.00	57.10	24.22	2169.33	493.07N	80.28W	1.42	51.78
2350.00	57.05	25.14	2174.77	500.70N	76.78W	2.32	57.14
2360.00	57.24	26.31	2180.19	508.27N	73.13W	3.00	62.62
2370.00	57.42	27.52	2185.59	515.78N	69.32W	3.10	68.24
2380.00	58.21	28.97	2190.92	523.23N	65.31W	4.38	74.04
2390.00	59.14	30.08	2196.12	530.66N	61.10W	3.98	80.03
2400.00	59.26	30.69	2201.24	538.07N	56.76W	1.61	86.15
2410.00	59.24	31.32	2206.35	545.44N	52.33W	1.63	92.33
2420.00	58.82	31.74	2211.49	552.75N	47.85W	1.66	98.55
2430.00	58.83	32.37	2216.67	560.00N	43.31W	1.62	104.81
2440.00	59.14	33.25	2221.82	567.20N	38.66W	2.45	111.16

All data is in Metres unless otherwise stated
Coordinates are from Installation MD's are from Rig and TVD's are from Rig (Borgland Dolphin 31.0m above Mean Sea Level)
Vertical Section is from 6.99N 3.64W on azimuth 75.00 degrees
Bottom hole distance is 1624.65 Metres on azimuth 39.03 degrees from Wellhead
Calculation method uses Minimum Curvature method
Prepared by Statoil

Statoil,Slot #4
Norne B,6608/10
NORNE,Norway

Wellbore: B-4 AH
Wellpath: B-4 AH Definitive
(TD@3900) Prelim
Date Printed: 20-Feb-2002

STATOIL

Wellpath Report

MD[m]	Inc[deg]	Dir[deg]	TVD[m]	North[m]	East[m]	Dogleg [deg/30m]	Vertical Section[m]
2450.00	59.36	33.59	2226.94	574.38N	33.93W	1.10	117.59
2460.00	59.28	33.69	2232.04	581.53N	29.17W	0.35	124.05
2470.00	59.34	33.52	2237.14	588.70N	24.41W	0.47	130.50
2480.00	58.90	33.83	2242.28	595.84N	19.65W	1.54	136.94
2490.00	58.64	34.18	2247.46	602.93N	14.87W	1.19	143.40
2500.00	59.30	34.36	2252.62	610.01N	10.04W	2.03	149.89
2510.00	59.92	34.37	2257.68	617.13N	5.17W	1.86	156.44
2520.00	60.02	34.41	2262.68	624.27N	0.28W	0.32	163.01
2530.00	59.52	34.79	2267.71	631.39N	4.63E	1.79	169.59
2540.00	59.75	35.23	2272.77	638.45N	9.57E	1.33	176.20
2550.00	60.08	35.25	2277.78	645.52N	14.57E	0.99	182.85
2560.00	59.93	35.47	2282.78	652.58N	19.58E	0.73	189.52
2570.00	59.68	35.61	2287.81	659.62N	24.60E	0.83	196.19
2580.00	59.84	35.55	2292.85	666.64N	29.63E	0.50	202.87
2590.00	59.73	35.58	2297.88	673.67N	34.66E	0.34	209.54
2600.00	59.56	35.51	2302.93	680.69N	39.67E	0.54	216.20
2610.00	59.66	35.74	2307.99	687.71N	44.70E	0.67	222.87
2620.00	59.74	35.88	2313.04	694.71N	49.75E	0.43	229.56
2630.00	60.02	36.11	2318.05	701.71N	54.83E	1.03	236.29
2640.00	60.46	36.23	2323.02	708.71N	59.96E	1.36	243.05
2650.00	60.61	36.63	2327.94	715.72N	65.13E	1.14	249.86
2660.00	60.68	36.83	2332.84	722.70N	70.34E	0.56	256.70
2670.00	60.65	36.65	2337.74	729.69N	75.55E	0.48	263.54
2680.00	60.52	36.94	2342.65	736.66N	80.77E	0.85	270.39
2690.00	61.06	37.28	2347.53	743.63N	86.04E	1.85	277.28
2700.00	61.78	37.90	2352.31	750.58N	91.39E	2.71	284.25
2710.00	61.93	38.31	2357.03	757.52N	96.84E	1.17	291.30
2720.00	61.95	38.65	2361.74	764.43N	102.33E	0.90	298.40
2730.00	62.13	38.63	2366.42	771.33N	107.84E	0.54	305.51
2740.00	62.07	38.57	2371.10	778.24N	113.36E	0.24	312.62
2750.00	61.91	38.81	2375.80	785.13N	118.88E	0.80	319.74
2760.00	62.05	38.92	2380.50	792.00N	124.41E	0.51	326.87
2770.00	61.53	38.95	2385.22	798.86N	129.95E	1.56	333.99
2780.00	61.75	39.11	2389.97	805.69N	135.49E	0.78	341.11
2790.00	61.74	38.96	2394.71	812.53N	141.04E	0.40	348.24
2800.00	61.54	38.91	2399.46	819.38N	146.57E	0.61	355.35
2810.00	61.47	39.01	2404.23	826.21N	152.10E	0.34	362.46
2820.00	61.66	38.99	2408.99	833.05N	157.63E	0.57	369.58
2830.00	61.63	38.81	2413.74	839.89N	163.16E	0.48	376.69
2840.00	61.18	39.31	2418.53	846.71N	168.69E	1.89	383.79
2850.00	61.24	40.03	2423.34	853.46N	174.29E	1.90	390.94
2860.00	60.71	40.88	2428.19	860.11N	179.96E	2.74	398.15
2870.00	60.79	41.88	2433.08	866.66N	185.73E	2.63	405.41
2880.00	60.16	42.91	2438.01	873.09N	191.59E	3.29	412.74
2890.00	60.30	44.27	2442.97	879.37N	197.58E	3.57	420.15
2900.00	60.06	45.45	2447.95	885.52N	203.70E	3.15	427.65
2910.00	60.06	46.88	2452.94	891.52N	209.95E	3.72	435.24
2920.00	59.89	47.77	2457.94	897.39N	216.31E	2.37	442.91
2930.00	60.01	48.66	2462.95	903.16N	222.77E	2.34	450.64
2940.00	59.87	49.70	2467.96	908.82N	229.32E	2.73	458.43
2950.00	59.96	50.28	2472.97	914.38N	235.94E	1.53	466.27
2960.00	59.69	51.40	2478.00	919.84N	242.65E	3.02	474.16
2970.00	59.78	51.87	2483.04	925.20N	249.42E	1.25	482.09
2980.00	60.04	52.89	2488.05	930.48N	256.27E	2.76	490.07
2990.00	60.50	53.89	2493.01	935.66N	263.24E	2.95	498.15
3000.00	61.54	54.36	2497.86	940.78N	270.33E	3.35	506.32
3010.00	62.71	55.49	2502.53	945.86N	277.57E	4.62	514.62

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Vertical Section is from 6.99N 3.64W on azimuth 75.00 degrees
Bottom hole distance is 1624.65 Metres on azimuth 39.03 degrees from Wellhead
Calculation method uses Minimum Curvature method
Prepared by Statoil

Statoil,Slot #4
Norne B,6608/10
NORNE,Norway

Wellbore: B-4 AH
Wellpath: B-4 AH Definitive
(TD@3900) Prelim
Date Printed: 20-Feb-2002

STATOIL

Wellpath Report

MD[m]	Inc[deg]	Dir[deg]	TVD[m]	North[m]	East[m]	Dogleg [deg/30m]	Vertical Section[m]
3020.00	63.49	56.38	2507.06	950.86N	284.95E	3.34	523.05
3030.00	64.51	56.90	2511.44	955.80N	292.46E	3.37	531.58
3040.00	65.14	57.54	2515.69	960.70N	300.07E	2.57	540.20
3050.00	65.19	57.98	2519.89	965.54N	307.75E	1.21	548.87
3060.00	65.77	58.31	2524.04	970.34N	315.47E	1.96	557.57
3070.00	66.08	58.66	2528.12	975.12N	323.26E	1.34	566.33
3080.00	66.17	58.98	2532.17	979.85N	331.08E	0.92	575.11
3090.00	66.81	59.47	2536.16	984.54N	338.96E	2.35	583.93
3100.00	67.06	59.98	2540.08	989.18N	346.90E	1.60	592.81
3128.60	68.04	57.18	2551.00	1002.96N	369.46E	2.90	618.16
3157.50	68.51	60.90	2561.70	1016.77N	392.47E	3.62	643.97
3186.10	69.20	59.83	2572.02	1029.96N	415.66E	1.27	669.77
3215.40	70.04	64.38	2582.23	1042.80N	439.93E	4.45	696.54
3244.10	72.63	64.00	2591.41	1054.64N	464.40E	2.73	723.24
3268.00	75.27	65.99	2598.02	1064.34N	485.21E	4.09	745.86
3306.00	76.64	68.70	2607.24	1078.54N	519.23E	2.34	782.39
3306.60	76.66	68.74	2607.38	1078.75N	519.77E	2.19	782.97
3325.00	78.55	68.40	2611.33	1085.32N	536.50E	3.13	800.83
3351.50	80.81	69.62	2616.08	1094.65N	560.84E	2.90	826.76
3378.40	83.60	70.42	2619.72	1103.76N	585.89E	3.23	853.30
3410.00	83.98	73.69	2623.15	1113.44N	615.77E	3.11	884.67
3439.00	82.05	72.52	2626.67	1121.80N	643.31E	2.33	913.44
3467.60	79.63	72.12	2631.22	1130.37N	670.21E	2.57	941.64
3497.00	77.80	71.41	2636.98	1139.40N	697.59E	2.00	970.43
3526.00	75.84	68.81	2643.59	1149.00N	724.14E	3.31	998.56
3553.30	74.31	67.55	2650.62	1158.80N	748.63E	2.15	1024.75
3583.70	73.15	65.86	2659.14	1170.34N	775.43E	1.97	1053.62
3611.70	69.85	63.83	2668.02	1181.62N	799.46E	4.09	1079.76
3641.10	67.19	64.69	2678.79	1193.50N	824.10E	2.83	1106.63
3670.40	65.09	65.63	2690.64	1204.76N	848.42E	2.32	1133.03
3698.50	61.44	66.87	2703.28	1214.87N	871.38E	4.07	1157.83
3727.60	58.89	67.99	2717.76	1224.56N	894.69E	2.81	1182.85
3757.10	56.12	68.55	2733.60	1233.77N	917.80E	2.86	1207.56
3785.20	51.62	68.69	2750.17	1242.05N	938.93E	4.81	1230.11
3843.30	47.59	72.10	2787.82	1256.92N	980.58E	2.48	1274.19
3871.80	45.19	72.67	2807.47	1263.17N	1000.24E	2.56	1294.80
3900.00	45.19	72.67	2827.35	1269.13N	1019.34E	0.00	1314.79

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Coordinates are from Installation MD's are from Rig and TVD's are from Rig (Borgland Dolphin 31.0m above Mean Sea Level)
Vertical Section is from 6.99N 3.64W on azimuth 75.00 degrees
Bottom hole distance is 1624.65 Metres on azimuth 39.03 degrees from Wellhead
Calculation method uses Minimum Curvature method
Prepared by Statoil

Statoil,Slot #4
Norne B,6608/10
NORNE,Norway

Wellbore: B-4 AH
Wellpath: B-4 AH Definitive
(TD@3900) Prelim
Date Printed: 20-Feb-2002

STATOIL

Hole Sections

Diameter [in]	Start MD[m]	Start TVD[m]	Start North[m]	Start East[m]	End MD[m]	End TVD[m]	End North[m]	Start East[m]	Wellbore
36.000	402.70	402.70	6.99N	3.64W	478.00				B-4 H
17 1/2	478.00				1315.00				B-4 H
12 1/4	1315.00				2564.00		655.40N	21.59E	B-4 H
12 1/4	1320.00	1304.70	34.60N	130.66W	3280.00	2601.03	1068.99N	495.86E	B-4 AH
8 1/2	3280.00	2601.03	1068.99N	495.86E	3900.00	2827.35	1269.13N	1019.34E	B-4 AH

Casings

Name	Top MD[m]	Top TVD[m]	Top North[m]	Top East[m]	Shoe MD[m]	Shoe TVD[m]	Shoe North[m]	Shoe East[m]	Wellbore
30,000in Conductor	402.70	402.70	6.99N	3.64W	476.00				B-4 H
13 3/8in Casing	402.70	402.70	6.99N	3.64W	1307.60				B-4 H
9 5/8in Casing	402.70	402.70	6.99N	3.64W	2556.20				B-4 H
9 5/8in Casing	402.70	402.70	6.99N	3.64W	3271.20	2598.83	1065.60N	488.05E	B-4 AH
7.000in Liner	3241.10	2590.51	1053.39N	461.83E	4341.00	2647.49	1420.57N	1492.18E	B-4 BH

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Vertical Section is from 6.99N 3.64W on azimuth 75.00 degrees
Bottom hole distance is 1624.65 Metres on azimuth 39.03 degrees from Wellhead
Calculation method uses Minimum Curvature method
Prepared by Statoil

Statoil,Slot #4
Norne B,6608/10
NORNE,Norway

Wellbore: B-4 BH
Wellpath: B-4 BH Definitive
(TD@4346) prelim.
Date Printed: 20-Feb-2002

STATOIL

Wellbore

Name	Created	Last Revised
B-4 BH	1-Feb-2002	1-Feb-2002

Well

Name	Government ID	Last Revised
6608/10-B-4 BH		1-Feb-2002

Slot

Name	Grid Northing	Grid Easting	Latitude	Longitude	North	East
Slot #4	7322136.3874	457114.1614	N66 0 55.4733	E8 3 16.3715	6.99N	3.64W

Installation

Name	Easting	Northing	Coord System Name	North Alignment
Norne B	457117.800	7322129.400	ED50-UTM-32N on EUROPEAN DATUM 1950 datum	Grid

Field

Name	Easting	Northing	Coord System Name	North Alignment
NORNE	458667.000	7323438.000	ED50-UTM-32N on EUROPEAN DATUM 1950 datum	Grid

Created By

Comments

All data is in Metres unless otherwise stated
Coordinates are from Installation MD's are from Rig and TVD's are from Rig (Borgland Dolphin 31.0m above Mean Sea Level)
Vertical Section is from 6.99N 3.64W on azimuth 46.69 degrees
Bottom hole distance is 2062.47 Metres on azimuth 46.69 degrees from Wellhead
Calculation method uses Minimum Curvature method
Prepared by Statoil

Statoil,Slot #4
Norne B,6608/10
NORNE,Norway

Wellbore: B-4 BH
Wellpath: B-4 BH Definitive
(TD@4346) prelim.
Date Printed: 20-Feb-2002

STATOIL

Wellpath Report

MD[m]	Inc[deg]	Dir[deg]	TVD[m]	North[m]	East[m]	Dogleg [deg/30m]	Vertical Section[m]
402.70	0.00	0.00	402.70	6.99N	3.64W	0.00	0.00
1320.00	14.31	288.97	1304.70	34.60N	130.66W	0.47	-73.48
1330.00	13.72	293.58	1314.41	35.47N	132.91W	3.79	-74.52
1340.00	13.66	297.80	1324.12	36.50N	135.04W	3.00	-75.37
1350.00	13.86	299.87	1333.84	37.65N	137.13W	1.59	-76.09
1360.00	14.41	301.34	1343.53	38.89N	139.23W	1.97	-76.77
1370.00	14.97	301.72	1353.21	40.22N	141.39W	1.70	-77.43
1380.00	15.57	303.22	1362.85	41.63N	143.61W	2.15	-78.08
1390.00	15.98	304.24	1372.48	43.14N	145.87W	1.48	-78.69
1400.00	16.63	305.66	1382.08	44.75N	148.17W	2.29	-79.26
1410.00	17.24	307.90	1391.64	46.49N	150.51W	2.68	-79.76
1420.00	17.51	309.45	1401.18	48.36N	152.84W	1.61	-80.17
1430.00	17.67	312.28	1410.72	50.34N	155.12W	2.61	-80.48
1440.00	17.81	314.80	1420.24	52.44N	157.33W	2.34	-80.65
1450.00	17.73	316.97	1429.77	54.63N	159.45W	2.00	-80.69
1460.00	17.41	319.48	1439.30	56.88N	161.46W	2.47	-80.61
1470.00	17.18	322.27	1448.85	59.18N	163.34W	2.58	-80.39
1480.00	16.96	325.35	1458.41	61.55N	165.07W	2.79	-80.03
1490.00	16.48	327.80	1467.98	63.95N	166.66W	2.56	-79.54
1500.00	15.87	331.53	1477.59	66.35N	168.07W	3.61	-78.91
1510.00	15.48	334.93	1487.22	68.76N	169.28W	2.99	-78.14
1520.00	15.34	337.95	1496.86	71.20N	170.34W	2.44	-77.25
1530.00	15.29	340.09	1506.50	73.66N	171.29W	1.70	-76.24
1540.00	15.20	342.88	1516.15	76.16N	172.13W	2.22	-75.14
1550.00	15.15	346.71	1525.80	78.68N	172.81W	3.01	-73.91
1560.00	15.43	348.95	1535.45	81.26N	173.37W	1.96	-72.54
1570.00	15.70	351.08	1545.08	83.90N	173.83W	1.90	-71.07
1580.00	16.35	353.38	1554.69	86.64N	174.20W	2.73	-69.46
1590.00	16.61	353.79	1564.28	89.45N	174.52W	0.85	-67.76
1600.00	16.91	353.94	1573.86	92.32N	174.83W	0.91	-66.02
1610.00	17.46	354.37	1583.41	95.26N	175.13W	1.69	-64.22
1620.00	18.12	354.59	1592.93	98.30N	175.42W	1.99	-62.35
1630.00	18.52	354.92	1602.43	101.43N	175.71W	1.24	-60.41
1640.00	19.09	355.40	1611.89	104.64N	175.98W	1.77	-58.40
1650.00	19.44	355.56	1621.33	107.93N	176.24W	1.06	-56.34
1660.00	20.08	355.45	1630.74	111.30N	176.51W	1.92	-54.22
1670.00	20.66	355.32	1640.12	114.77N	176.79W	1.75	-52.04
1680.00	21.11	355.12	1649.46	118.33N	177.08W	1.37	-49.82
1690.00	21.89	355.42	1658.77	121.98N	177.39W	2.36	-47.53
1700.00	23.13	356.52	1668.00	125.80N	177.65W	3.93	-45.11
1710.00	23.59	356.55	1677.18	129.75N	177.89W	1.38	-42.57
1720.00	24.59	356.16	1686.31	133.83N	178.15W	3.04	-39.96
1730.00	25.91	356.76	1695.36	138.09N	178.42W	4.03	-37.23
1740.00	26.61	357.01	1704.32	142.50N	178.66W	2.13	-34.38
1750.00	27.20	357.48	1713.24	147.02N	178.87W	1.88	-31.44
1760.00	27.54	357.85	1722.12	151.62N	179.06W	1.14	-28.42
1770.00	27.75	358.18	1730.98	156.25N	179.22W	0.78	-25.36
1780.00	27.88	358.81	1739.83	160.92N	179.35W	0.96	-22.25
1790.00	27.94	359.52	1748.66	165.60N	179.41W	1.01	-19.09
1800.00	27.67	0.10	1757.51	170.26N	179.43W	1.15	-15.90
1810.00	27.41	1.53	1766.38	174.89N	179.36W	2.13	-12.68
1820.00	27.46	2.94	1775.25	179.49N	179.18W	1.95	-9.39
1830.00	27.84	4.12	1784.11	184.12N	178.90W	2.00	-6.00
1840.00	28.40	4.60	1792.93	188.82N	178.54W	1.81	-2.52
1850.00	28.94	4.95	1801.70	193.60N	178.14W	1.70	1.05
1860.00	29.48	6.03	1810.43	198.46N	177.67W	2.26	4.72
1870.00	30.02	6.93	1819.11	203.39N	177.11W	2.10	8.51

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Vertical Section is from 6.99N 3.64W on azimuth 46.69 degrees
Bottom hole distance is 2062.47 Metres on azimuth 46.69 degrees from Wellhead
Calculation method uses Minimum Curvature method
Prepared by Statoil

Statoil,Slot #4
Norne B,6608/10
NORNE,Norway

Wellbore: B-4 BH
Wellpath: B-4 BH Definitive
(TD@4346) prelim.
Date Printed: 20-Feb-2002

STATOIL

Wellpath Report

MD[m]	Inc[deg]	Dir[deg]	TVD[m]	North[m]	East[m]	Dogleg [deg/30m]	Vertical Section[m]
1880.00	30.14	7.93	1827.77	208.36N	176.46W	1.55	12.39
1890.00	30.11	9.59	1836.42	213.32N	175.70W	2.50	16.35
1900.00	30.71	11.40	1845.04	218.30N	174.78W	3.29	20.44
1910.00	31.16	12.86	1853.62	223.32N	173.70W	2.63	24.67
1920.00	31.54	13.61	1862.16	228.38N	172.51W	1.63	29.01
1930.00	32.13	14.82	1870.65	233.50N	171.21W	2.61	33.46
1940.00	32.71	15.53	1879.09	238.67N	169.81W	2.08	38.03
1950.00	33.55	15.73	1887.47	243.94N	168.33W	2.54	42.72
1960.00	34.34	16.08	1895.76	249.31N	166.80W	2.44	47.51
1970.00	34.54	16.24	1904.01	254.74N	165.23W	0.66	52.39
1980.00	34.51	16.77	1912.25	260.17N	163.62W	0.91	57.28
1990.00	34.89	16.91	1920.47	265.62N	161.97W	1.16	62.22
2000.00	35.46	17.06	1928.65	271.13N	160.29W	1.73	67.23
2010.00	35.97	16.87	1936.77	276.71N	158.58W	1.57	72.30
2020.00	36.20	16.77	1944.85	282.35N	156.88W	0.71	77.40
2030.00	35.96	16.66	1952.93	287.99N	155.19W	0.75	82.51
2040.00	35.60	16.65	1961.04	293.59N	153.51W	1.08	87.57
2050.00	35.60	16.58	1969.17	299.17N	151.84W	0.12	92.61
2060.00	35.49	16.99	1977.31	304.74N	150.17W	0.79	97.64
2070.00	35.53	16.95	1985.45	310.29N	148.47W	0.14	102.69
2080.00	35.85	16.98	1993.57	315.87N	146.77W	0.96	107.76
2090.00	36.91	16.99	2001.62	321.55N	145.04W	3.18	112.91
2100.00	38.00	17.26	2009.56	327.36N	143.25W	3.31	118.20
2110.00	38.69	17.95	2017.40	333.27N	141.37W	2.44	123.62
2120.00	39.22	18.37	2025.18	339.24N	139.41W	1.78	129.14
2130.00	39.69	19.31	2032.90	345.26N	137.36W	2.28	134.76
2140.00	40.55	19.93	2040.55	351.33N	135.19W	2.84	140.50
2150.00	41.91	20.10	2048.07	357.52N	132.94W	4.09	146.39
2160.00	42.92	20.50	2055.45	363.85N	130.60W	3.14	152.43
2170.00	43.89	20.62	2062.72	370.28N	128.18W	2.92	158.60
2180.00	45.37	20.62	2069.83	376.85N	125.71W	4.44	164.91
2190.00	45.37	19.80	2076.86	383.53N	123.25W	1.75	171.28
2200.00	45.78	19.85	2083.86	390.25N	120.83W	1.23	177.65
2210.00	46.42	20.01	2090.79	397.02N	118.37W	1.95	184.09
2220.00	47.73	20.19	2097.60	403.90N	115.86W	3.95	190.64
2230.00	49.34	20.12	2104.22	410.94N	113.27W	4.83	197.34
2240.00	50.66	20.03	2110.65	418.13N	110.64W	3.97	204.19
2250.00	51.39	20.15	2116.94	425.43N	107.97W	2.21	211.14
2260.00	52.03	20.28	2123.14	432.80N	105.26W	1.94	218.17
2270.00	52.46	20.85	2129.26	440.20N	102.48W	1.87	225.27
2280.00	52.82	21.35	2135.33	447.62N	99.62W	1.61	232.43
2290.00	53.38	22.26	2141.33	455.04N	96.65W	2.75	239.69
2300.00	54.54	22.94	2147.22	462.50N	93.55W	3.85	247.07
2310.00	56.01	23.22	2152.91	470.07N	90.32W	4.46	254.60
2320.00	56.75	23.35	2158.45	477.71N	87.03W	2.24	262.24
2330.00	57.14	23.66	2163.90	485.40N	83.69W	1.41	269.95
2340.00	57.10	24.22	2169.33	493.07N	80.28W	1.42	277.69
2350.00	57.05	25.14	2174.77	500.70N	76.78W	2.32	285.48
2360.00	57.24	26.31	2180.19	508.27N	73.13W	3.00	293.32
2370.00	57.42	27.52	2185.59	515.78N	69.32W	3.10	301.24
2380.00	58.21	28.97	2190.92	523.23N	65.31W	4.38	309.27
2390.00	59.14	30.08	2196.12	530.66N	61.10W	3.98	317.43
2400.00	59.26	30.69	2201.24	538.07N	56.76W	1.61	325.68
2410.00	59.24	31.32	2206.35	545.44N	52.33W	1.63	333.95
2420.00	58.82	31.74	2211.49	552.75N	47.85W	1.66	342.23
2430.00	58.83	32.37	2216.67	560.00N	43.31W	1.62	350.51
2440.00	59.14	33.25	2221.82	567.20N	38.66W	2.45	358.83

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Prepared by Statoil

Statoil,Slot #4
Norne B,6608/10
NORNE,Norway

Wellbore: B-4 BH
Wellpath: B-4 BH Definitive
(TD@4346) prelim.
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STATOIL

Wellpath Report

MD[m]	Inc[deg]	Dir[deg]	TVD[m]	North[m]	East[m]	Dogleg [deg/30m]	Vertical Section[m]
2450.00	59.36	33.59	2226.94	574.38N	33.93W	1.10	367.19
2460.00	59.28	33.69	2232.04	581.53N	29.17W	0.35	375.57
2470.00	59.34	33.52	2237.14	588.70N	24.41W	0.47	383.95
2480.00	58.90	33.83	2242.28	595.84N	19.65W	1.54	392.31
2490.00	58.64	34.18	2247.46	602.93N	14.87W	1.19	400.65
2500.00	59.30	34.36	2252.62	610.01N	10.04W	2.03	409.02
2510.00	59.92	34.37	2257.68	617.13N	5.17W	1.86	417.45
2520.00	60.02	34.41	2262.68	624.27N	0.28W	0.32	425.90
2530.00	59.52	34.79	2267.71	631.39N	4.63E	1.79	434.35
2540.00	59.75	35.23	2272.77	638.45N	9.57E	1.33	442.80
2550.00	60.08	35.25	2277.78	645.52N	14.57E	0.99	451.28
2560.00	59.93	35.47	2282.78	652.58N	19.58E	0.73	459.78
2570.00	59.68	35.61	2287.81	659.62N	24.60E	0.83	468.26
2580.00	59.84	35.55	2292.85	666.64N	29.63E	0.50	476.73
2590.00	59.73	35.58	2297.88	673.67N	34.66E	0.34	485.21
2600.00	59.56	35.51	2302.93	680.69N	39.67E	0.54	493.68
2610.00	59.66	35.74	2307.99	687.71N	44.70E	0.67	502.14
2620.00	59.74	35.88	2313.04	694.71N	49.75E	0.43	510.62
2630.00	60.02	36.11	2318.05	701.71N	54.83E	1.03	519.12
2640.00	60.46	36.23	2323.02	708.71N	59.96E	1.36	527.66
2650.00	60.61	36.63	2327.94	715.72N	65.13E	1.14	536.23
2660.00	60.68	36.83	2332.84	722.70N	70.34E	0.56	544.81
2670.00	60.65	36.65	2337.74	729.69N	75.55E	0.48	553.40
2680.00	60.52	36.94	2342.65	736.66N	80.77E	0.85	561.98
2690.00	61.06	37.28	2347.53	743.63N	86.04E	1.85	570.59
2700.00	61.78	37.90	2352.31	750.58N	91.39E	2.71	579.26
2710.00	61.93	38.31	2357.03	757.52N	96.84E	1.17	587.98
2720.00	61.95	38.65	2361.74	764.43N	102.33E	0.90	596.71
2730.00	62.13	38.63	2366.42	771.33N	107.84E	0.54	605.46
2740.00	62.07	38.57	2371.10	778.24N	113.36E	0.24	614.21
2750.00	61.91	38.81	2375.80	785.13N	118.88E	0.80	622.95
2760.00	62.05	38.92	2380.50	792.00N	124.41E	0.51	631.69
2770.00	61.53	38.95	2385.22	798.86N	129.95E	1.56	640.43
2780.00	61.75	39.11	2389.97	805.69N	135.49E	0.78	649.15
2790.00	61.74	38.96	2394.71	812.53N	141.04E	0.40	657.88
2800.00	61.54	38.91	2399.46	819.38N	146.57E	0.61	666.60
2810.00	61.47	39.01	2404.23	826.21N	152.10E	0.34	675.31
2820.00	61.66	38.99	2408.99	833.05N	157.63E	0.57	684.02
2830.00	61.63	38.81	2413.74	839.89N	163.16E	0.48	692.74
2840.00	61.18	39.31	2418.53	846.71N	168.69E	1.89	701.44
2850.00	61.24	40.03	2423.34	853.46N	174.29E	1.90	710.14
2860.00	60.71	40.88	2428.19	860.11N	179.96E	2.74	718.83
2870.00	60.79	41.88	2433.08	866.66N	185.73E	2.63	727.52
2880.00	60.16	42.91	2438.01	873.09N	191.59E	3.29	736.20
2890.00	60.30	44.27	2442.97	879.37N	197.58E	3.57	744.86
2900.00	60.06	45.45	2447.95	885.52N	203.70E	3.15	753.53
2910.00	60.06	46.88	2452.94	891.52N	209.95E	3.72	762.20
2920.00	59.89	47.77	2457.94	897.39N	216.31E	2.37	770.86
2930.00	60.01	48.66	2462.95	903.16N	222.77E	2.34	779.51
2940.00	59.87	49.70	2467.96	908.82N	229.32E	2.73	788.16
2950.00	59.96	50.28	2472.97	914.38N	235.94E	1.53	796.79
2960.00	59.69	51.40	2478.00	919.84N	242.65E	3.02	805.42
2970.00	59.78	51.87	2483.04	925.20N	249.42E	1.25	814.02
2980.00	60.04	52.89	2488.05	930.48N	256.27E	2.76	822.63
2990.00	60.50	53.89	2493.01	935.66N	263.24E	2.95	831.26
3000.00	61.54	54.36	2497.86	940.78N	270.33E	3.35	839.93
3010.00	62.71	55.49	2502.53	945.86N	277.57E	4.62	848.68

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NORNE,Norway

Wellbore: B-4 BH
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(TD@4346) prelim.
Date Printed: 20-Feb-2002

STATOIL

Wellpath Report

MD[m]	Inc[deg]	Dir[deg]	TVD[m]	North[m]	East[m]	Dogleg [deg/30m]	Vertical Section[m]
3020.00	63.49	56.38	2507.06	950.86N	284.95E	3.34	857.48
3030.00	64.51	56.90	2511.44	955.80N	292.46E	3.37	866.33
3040.00	65.14	57.54	2515.69	960.70N	300.07E	2.57	875.23
3050.00	65.19	57.98	2519.89	965.54N	307.75E	1.21	884.14
3060.00	65.77	58.31	2524.04	970.34N	315.47E	1.96	893.05
3070.00	66.08	58.66	2528.12	975.12N	323.26E	1.34	901.99
3080.00	66.17	58.98	2532.17	979.85N	331.08E	0.92	910.93
3090.00	66.81	59.47	2536.16	984.54N	338.96E	2.35	919.88
3100.00	67.06	59.98	2540.08	989.18N	346.90E	1.60	928.84
3128.60	68.04	57.18	2551.00	1002.96N	369.46E	2.90	954.71
3157.50	68.51	60.90	2561.70	1016.77N	392.47E	3.62	980.92
3186.10	69.20	59.83	2572.02	1029.96N	415.66E	1.27	1006.84
3215.40	70.04	64.38	2582.23	1042.80N	439.93E	4.45	1033.31
3244.10	72.63	64.00	2591.41	1054.64N	464.40E	2.73	1059.24
3268.00	75.27	65.99	2598.02	1064.34N	485.21E	4.09	1081.04
3290.00	76.06	67.56	2603.47	1072.75N	504.80E	2.34	1101.06
3315.70	76.03	69.88	2609.67	1081.80N	528.04E	2.63	1124.17
3346.80	76.68	69.22	2617.00	1092.36N	556.36E	0.88	1152.02
3373.90	80.91	68.67	2622.27	1101.91N	581.16E	4.72	1176.62
3401.90	83.80	69.58	2625.99	1111.79N	607.09E	3.24	1202.27
3429.80	85.96	70.17	2628.48	1121.35N	633.18E	2.41	1227.81
3459.70	87.38	73.27	2630.22	1130.71N	661.52E	3.42	1254.85
3488.90	87.12	69.60	2631.62	1140.00N	689.16E	3.78	1281.33
3517.90	87.37	69.08	2633.01	1150.22N	716.26E	0.60	1308.06
3548.00	86.57	65.22	2634.61	1161.89N	743.96E	3.92	1336.22
3574.70	88.05	67.05	2635.86	1172.68N	768.35E	2.64	1361.36
3602.60	87.31	68.69	2636.99	1183.18N	794.17E	1.93	1387.36
3631.80	87.56	69.70	2638.29	1193.54N	821.44E	1.07	1414.30
3660.90	86.32	71.60	2639.85	1203.17N	848.85E	2.34	1440.86
3688.60	88.11	73.13	2641.19	1211.55N	875.22E	2.55	1465.79
3719.70	86.27	71.36	2642.72	1221.02N	904.80E	2.46	1493.81
3748.60	87.19	73.22	2644.37	1229.80N	932.28E	2.15	1519.83
3777.00	87.25	73.06	2645.74	1238.02N	959.43E	0.18	1545.22
3806.50	88.54	73.44	2646.83	1246.52N	987.66E	1.37	1571.59
3834.70	89.65	73.14	2647.27	1254.63N	1014.67E	1.22	1596.80
3863.70	89.53	74.05	2647.48	1262.82N	1042.48E	0.95	1622.66
3892.60	90.34	74.63	2647.51	1270.62N	1070.31E	1.03	1648.26
3921.10	90.02	73.03	2647.42	1278.55N	1097.68E	1.72	1673.62
3949.90	89.47	71.25	2647.55	1287.39N	1125.09E	1.94	1699.62
3979.00	90.58	70.73	2647.54	1296.87N	1152.61E	1.26	1726.14
4007.90	90.14	69.95	2647.36	1306.59N	1179.82E	0.93	1752.61
4034.80	90.08	69.08	2647.31	1316.00N	1205.02E	0.97	1777.40
4065.00	91.87	68.73	2646.79	1326.87N	1233.19E	1.81	1805.36
4094.90	92.91	67.65	2645.55	1337.97N	1260.92E	1.50	1833.15
4124.40	89.59	65.09	2644.90	1349.79N	1287.94E	4.26	1860.91
4151.70	87.01	65.16	2645.71	1361.27N	1312.69E	2.84	1886.80
4180.80	88.11	68.41	2646.95	1372.72N	1339.41E	3.53	1914.10
4208.90	89.71	70.25	2647.49	1382.64N	1365.69E	2.60	1940.02
4236.20	90.64	71.85	2647.40	1391.50N	1391.51E	2.03	1964.89
4266.60	90.27	73.90	2647.16	1400.45N	1420.56E	2.06	1992.17
4294.90	90.14	73.39	2647.06	1408.42N	1447.71E	0.56	2017.39
4319.60	89.22	75.21	2647.20	1415.11N	1471.49E	2.48	2039.28
4346.00	89.22	75.21	2647.56	1421.85N	1497.02E	0.00	2062.47

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NORNE,Norway

Wellbore: B-4 BH
Wellpath: B-4 BH Definitive
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STATOIL

Hole Sections

Diameter [in]	Start MD[m]	Start TVD[m]	Start North[m]	Start East[m]	End MD[m]	End TVD[m]	End North[m]	Start East[m]	Wellbore
36.000	402.70	402.70			478.00				B-4 H
17 1/2	478.00				1315.00				B-4 H
12 1/4	1315.00				2564.00		655.40N	21.59E	B-4 H
12 1/4	1320.00	1304.70	34.60N	130.66W	3280.00	2601.03	1068.99N	495.86E	B-4 AH
8 1/2	3280.00	2601.03	1068.99N	495.86E	3900.00	2827.35	1272.61N	1077.44E	B-4 AH
8 1/2	3290.00	2603.47	1072.75N	504.80E	4346.00	2647.56	1421.85N	1497.02E	B-4 BH

Casings

Name	Top MD[m]	Top TVD[m]	Top North[m]	Top East[m]	Shoe MD[m]	Shoe TVD[m]	Shoe North[m]	Shoe East[m]	Wellbore
30,000in Conductor	402.70	402.70	6.99N	3.64W	476.00				B-4 H
13 3/8in Casing	402.70	402.70	6.99N	3.64W	1307.60				B-4 H
9 5/8in Casing	402.70	402.70	6.99N	3.64W	2556.20				B-4 H
9 5/8in Casing	402.70	402.70	6.99N	3.64W	3271.20	2598.83	1065.60N	488.05E	B-4 AH
7.000in Liner	3241.10	2590.51	1053.39N	461.83E	4341.00	2647.49	1420.57N	1492.18E	B-4 BH

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