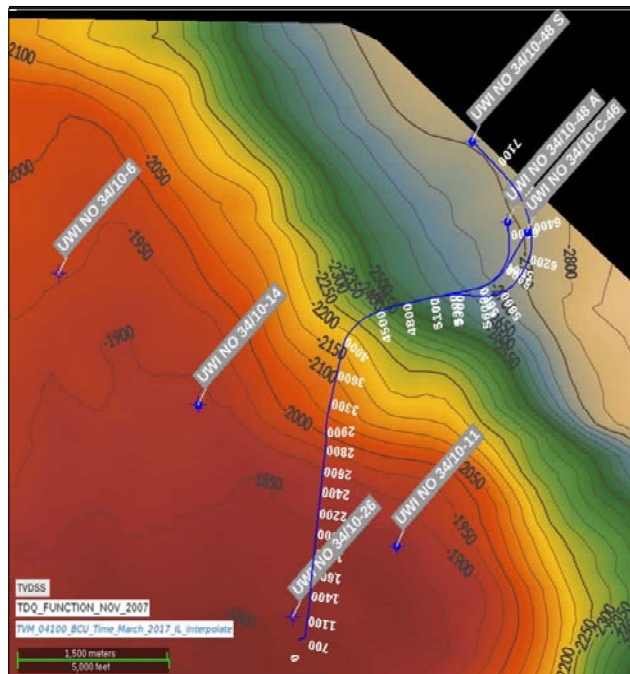




Scale 1:500

# Well: NO 34/10-48 A



<b>KB Elevation:</b>	84,1m	<b>Country:</b>	Norway
<b>Water Depth:</b>	216,9m	<b>Licence:</b>	PL050 / PL120
<b>Depth Reference:</b>	RKB	<b>Owners:</b>	PL050: Statoil (61%), Norsk Hydro (9%), Petoro (30%) PL120: Statoil (30.1%), Petoro (16.9%), Norsk Hydro (29%), Conoco (13%), TotalFinaElf (11%)
<b>Drillers Total Depth:</b>	6221,0m MD 2870,1m TVD	<b>Well Status:</b>	Sidetracked
<b>Loggers Total Depth:</b>	N/A N/A	<b>Formation at Total Depth:</b>	Heather
<b>Formation at Total Depth:</b>	Heather	<b>Platform:</b>	Topas (now called Gimle) Gullfaks C
<b>Date Sidetracked:</b>	22 des 2004	<b>Drilling Contractor:</b>	Smedvig
<b>Date Reached TD:</b>	04 jan 2005	<b>Mudlogging Company:</b>	Geoservices
<b>Date Abandoned:</b>	08 jan 2005	<b>Logging Company:</b>	Schlumberger
<b>Well Status:</b>	Sidetracked	<b>MWD Company:</b>	Schlumberger
<b>Well Classification:</b>	Appraisal	<b>Geologists:</b>	Inge Kaas, Siren Greve, Lennart Jensen, Magnar Saltnes, Lars Kristian Strønen, Stein Befring, Bjørn Kjellin
<b>Prepared By:</b>	Jan Arndt		
<b>Controlled By:</b>	Pascal Zanetta		
<b>Date:</b>	27 nov 2017		
<b>Revision:</b>	0		

Slot Location -0,93 mS +27.8 mE

### Well Introduction

**Primary objective**

The main objective of the well 34/10-48 S was to test the hydrocarbon potential of the Brent Group in the Topas (later called Gimle) prospect.

The preliminary results of the well 34/10-48 S indicated that the wellpath had penetrated low on the Topas structure and that the wellpath was not ideal for production. It was therefore decided to drill a sidetrack (called 34/10-48 A) and aim as high on the re-interpreted structure as possible.

But well 48 A, which kicked off at 5620m MD, was abandoned before reentering the Topas structure in the north, due to severe hole problems, which are described in more detail in the Final well report.

Drilling 48 A shallower than 48 S was done to increase the distance from the OWC, and then get a better production potential. After a roundtrip at 5850m MD it was impossible to continue drilling the 48 A well. Drilled several hard intervals which led to very low progress.

The change from hard stringers to softer adjacent formations caused problems while tripping in hole (ledges, washout). Had several trips due to equipment failures. Lost the wellpath due to severe hole problems when tripping in hole after a round trip at TD due to equipment failures. This roundtrip at TD (run 11) was not added to the logging summary table.

### Remarks

The 8 1/2" sidetrack hole was drilled in 3 runs.

Run one included a 6 3/4" PowerPulse MWD, 6 3/4" Vision resistivity tool, 6 3/4" ADN tool and 6 3/4" FPWD tool.

At the depth of 5846 m MD the rig top drive failed and the BHA was pulled back to the casing shoe to repair the equipment. One pressure point was taken at 5430 mMD while drilling and another 3 points were taken while pulling out to casing shoe at 5600, 5505, 5475 m MD.

When going down on bottom for drilling again tight hole was encountered and the hole packed off and string stalled out. While working through this problem area the 6 3/4" PowerPulse ceased working.

Next run was terminated at TD (6221 mMD) when directional control was lost through failure of the Xceed tool.

When attempting to run back to bottom the borehole was found to be in poor condition with several pack offs and the BHA was partly getting stuck. Eventually the BHA was worked to bottom but it was not possible to establish drilling parameters without the hole packing off. The BHA was pulled back and an open hole sidetrack was performed.

**Logging remarks**

ADN memory failed @5502m

Real-time DEN spliced into intervals 5502.4-5577.0m, 5645.0-5794.6m to avoid gap. Real-time NEU spliced into intervals 5500.7-5577.0m, 5649.7-5787.9m to avoid gap.

NEUDEN calculated with limestone matrix.

ROP data is MWD data. Mudlogging data was not available for this section. A table with gas peaks is below.

Gas peaks in the 8 1/2" section of the wells 34/10-48 A									
Depth m MD	Depth m TVD	Gas peak %	BG	C1	C2	C3	iC4	nC4	Type of gas
5170	2894.8	3.83	0.11	37398	1842	389			10 FG
5179	2897.6	10.19	0.64	102268	4354	1036	11		20 FG
5193	2895.2	11.85	0.65	99732	3915	942	10		19 FG
5210	2896.5	12.16	0.7	101284	3304	744			15 FG
5229	2896.9	2.17	0.32	28459	1392	335			12 FG
5230	2895.2	31.4		304590	12911	2542	18	190	STG
5230	2895.2	31.5		306334	10867	2506	235	18	FG
5244	2894.2	8.14	0.56	77511	3903	834	11		22 FG
5248	2893.7	3.43	0.96	28803	1569	470			17 FG
5264	2891.3	11.54	3.2	107317	3903	953	11		22 FG
5303	2883.2	13.97	5.1	121023	4328	1042	12		24 FG
5396	2861.9	15.75	6.3	152751	5232	1422	16		12 FG
5485	2842.6	13.52	5.4	112706	5900	1870	21		283 FG
5508	2838.8	15.09	5.5	137835	1739	1739	19		235 FG
5576	2834.8	10.8	3.7	105255	4268	927	10		22 FG
5606	2832.7	12.5	5.2	114824	5765	1698	18		241 FG
5685	2824.8	2.4	1	16019	622	20			FG
5795	2823.8	3.04	1.4	28364	1310	231	0		14 FG
5819	2826.8	2.05	0.8	18962	702	31	0		13 FG
5875	2833.0	2.24	0.5	17955	718	23			FG

Well Configuration and Logging Run

Hole Size (")	Hole Section MD (m)	Casing Size (")	Type	Shoe/Liner MD (m)	LOT / FIT / XLOT					Comments
					Date	Type	Result (g/cc)	Depth MD (m)	TVD RKB (m)	
12 1/4"	5105.0	9 5/8"	Casing shoe	5105	08 nov 2004	FIT	1.850	5105	2873.9	This casing was part of motherwell 48 S. FIT was performed before drilling wellbore 48A.

Run	Hole Size (")	Suite	Dates (From-To)	Interval MD (m)	Max Temp. (°C)	Comments
9	8 1/2"	GR-RES-DEN-NEU-FPWD	22 des 2004 - 30 des 2004	5108.0 - 5850.0	113	at 5552m DEU/NEU memory failed. DENC not part of composite data.
10	8 1/2"	GR-RES-DEN-NEU	31 des 2004 - 05 jan 2005	5850.0 - 6221.0	111	at 6075m Xceed tool failed. DENC not part of composite data.

Wireline Logging Summary						
Run	Hole Size (")	Suite	Dates (From-To)	Interval MD (m)	Max Temp. (°C)	Comments

Number	Type	Top MD (m)	Top TVD RKB (m)	Base MD (m)	Base TVD RKB (m)	Comments
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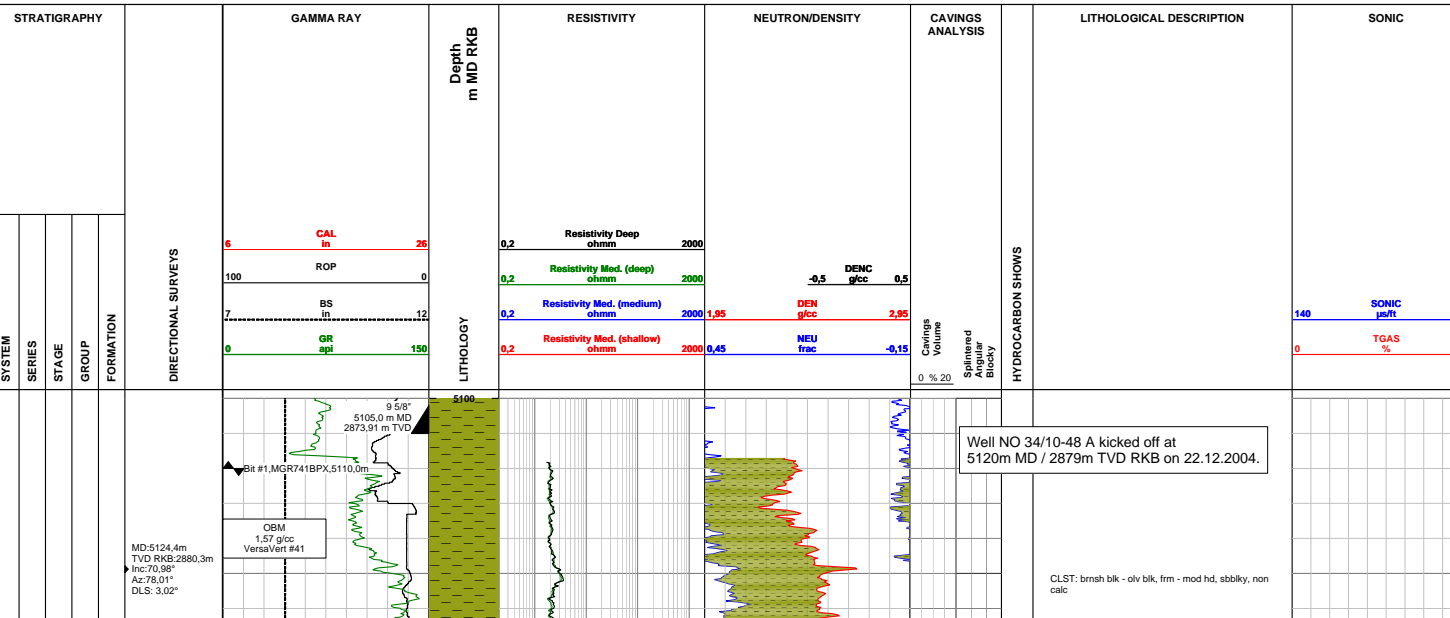
Strat. Unit	Name	Top MD (m)	Top TVD RKB (m)
GROUP	Brent Gp.	5158.0	2889.5
GROUP	Viking Group	5611.0	2832.3
GROUP	Cromer Knoll Gp.	5710.0	2823.0
GROUP	Viking Group	5752.0	2821.7
GROUP	Shetland Gp. (BCU)	5888.0	2844.4
GROUP	Cromer Knoll Gp.	6067.0	2852.3
GROUP	Viking Gp. (BCU)	6136.0	2859.3
FORMATION	Tarbert Fm.	5158.0	2889.5
FORMATION	Ness Fm.	5480.0	2848.3
FORMATION	Tarbert Fm.	5461.0	2848.0
FORMATION	Heather Fm.	5611.0	2832.3
FORMATION	Heather Fm.	5752.0	2821.7
FORMATION	Heather Fm.	6136.0	2859.3
MEMBER	Tarbert-3	5158.0	2889.5
MEMBER	Tarbert-2	5198.0	2895.0
MEMBER	Tarbert-1	5351.0	2871.6
MEMBER	Ness-3	5460.0	2848.3
MEMBER	Fault/Tarbert 1	5451.0	2848.0
MEMBER	Fault/Tarbert 2	5531.0	2836.8

Lithology Legend

CONGLOMERATE	COAL	SEDIMENTARY BEDDING	BROWN COAL	SAND / SANDSTONE	SILT / SILTSTONE	ANHYDRITE	FISSILE SILTSTONE	SALT	MUDSTONE	GYPNUM	FISSILE MUDSTONE	CLAY / CLAYSTONE	SHALE	PALEOSOL
CONGLOMERATE	COAL	SEDIMENTARY BEDDING	BROWN COAL	SAND / SANDSTONE	SILT / SILTSTONE	ANHYDRITE	FISSILE SILTSTONE	SALT	MUDSTONE	GYPNUM	FISSILE MUDSTONE	CLAY / CLAYSTONE	SHALE	PALEOSOL
CONGLOMERATE	COAL	SEDIMENTARY BEDDING	BROWN COAL	SAND / SANDSTONE	SILT / SILTSTONE	ANHYDRITE	FISSILE SILTSTONE	SALT	MUDSTONE	GYPNUM	FISSILE MUDSTONE	CLAY / CLAYSTONE	SHALE	PALEOSOL

Symbol Legend

Casing shoe	Liner hanger	Liner shoe	Milled window	Deviation survey - MWD	Deviation survey - Other	Core interval	Sidewall core (No recovery)	DST	SHOWS
Casing shoe	Liner hanger	Liner shoe	Milled window	Deviation survey - MWD	Deviation survey - Other	Core interval	Sidewall core (No recovery)	DST	SHOWS
Casing shoe	Liner hanger	Liner shoe	Milled window	Deviation survey - MWD	Deviation survey - Other	Core interval	Sidewall core (No recovery)	DST	SHOWS



MD:5151.8m  
TVD RKB:2888.0m  
Inc:76.13°  
Az:80.24°  
DLS: 6.11°

MD:5178.9m  
TVD RKB:2893.1m  
Inc:82.27°  
Az:80.81°  
DLS: 6.80°

MD:5206.0m  
TVD RKB:2895.4m  
Inc:87.80°  
Az:80.31°  
DLS: 6.27°

MD:5233.2m  
TVD RKB:2895.0m  
Inc:94.12°  
Az:79.74°  
DLS: 6.88°

MD:5260.5m  
TVD RKB:2891.9m  
Inc:98.91°  
Az:79.74°  
DLS: 5.27°

MD:5287.8m  
TVD RKB:2886.8m  
Inc:103.20°  
Az:78.31°  
DLS: 4.96°

MD:5315.2m  
TVD RKB:2880.2m  
Inc:103.85°  
Az:78.72°  
DLS: 0.84°

MD:5342.4m  
TVD RKB:2873.7m  
Inc:103.97°  
Az:78.94°  
DLS: 0.27°

MD:5369.7m  
TVD RKB:2867.3m  
Inc:103.26°  
Az:78.72°  
DLS: 0.81°

MD:5396.9m  
TVD RKB:2861.7m  
Inc:100.23°  
Az:78.41°  
DLS: 3.35°

MD:5424.2m  
TVD RKB:2856.5m  
Inc:101.85°  
Az:78.49°  
DLS: 1.78°

MD:5451.5m  
TVD RKB:2850.4m  
Inc:104.22°  
Az:79.33°

OBM  
1.57 g/cc  
VersaVert #41

OBM  
1.57 g/cc  
VersaVert #41

OBM  
1.57 g/cc  
VersaVert #41

5150

5200

5250

5300

5350

5400

5450

12

Tarbert Fm. Tarbert-3  
5158,m MD / 2889,5m TVD RKB

SST: lse qtz, clr - tmsl, v f - f, mod strd, aggr, frm, non  
- sil calc crnt

Tarbert-2  
5198,m MD / 2895,m TVD RKB

CLST: brnsh gry - brnsh blk, sft - frm, sbbkly, slty, occ  
grad to arg slst

SST: lse qtz, clr - tmsl, v f - m, mod strd, aggr, v f, slty,  
grad to slst

Drilling stratigraphically upwards

SST: lse qtz, clr, mlky wh, v f - m, pred v f, wl strd,  
sbrndd - sbrang,  
calc crnt

COAL: blk, brit, frm - mod hd

CLST: brnsh gry - brnsh blk, sft - frm, blkly

SST: lse qtz, clr, mlky wh, pred f - m, wl strd, sbrndd -  
sbrang

CLST: brnsh gry, brnsh blk, sft - frm, blkly

SST: lse qtz, clr, mlky wh, pred f - m, wl strd, sbrndd -  
sbrang

LS: v pl orn - pl yelsh brn, frm, blkly, occ arg

Tarbert-1  
5351,m MD / 2871,6m TVD RKB

COAL: blk, brit, shny

LS: v pl orn - pl yelsh brn, frm, blkly, occ arg

CLST: med dk gry - grysh blk, olv blk, frm - mod hd,  
occ lam

COAL: blk, blkly, mod hd

SST: lse qtz, clr - tmsl, occ mlky wh, med - crs, pred  
m, mod - wl strd,

DLS: 2.77°

MD:5478.4m  
TVD RKB:2844.0m  
Inc:103.00°  
Az:77.93°  
DLS: 2.04°

MD:5505.5m  
TVD RKB:2839.2m  
Inc:97.68°  
Az:73.91°  
DLS: 7.33°

MD:5532.8m  
TVD RKB:2836.8m  
Inc:92.43°  
Az:70.70°  
DLS: 6.75°

MD:5560.1m  
TVD RKB:2835.6m  
Inc:92.57°  
Az:66.04°  
DLS: 5.11°

MD:5587.4m  
TVD RKB:2834.1m  
Inc:93.77°  
Az:62.45°  
DLS: 4.16°

MD:5614.4m  
TVD RKB:2832.0m  
Inc:95.01°  
Az:58.80°  
DLS: 4.27°

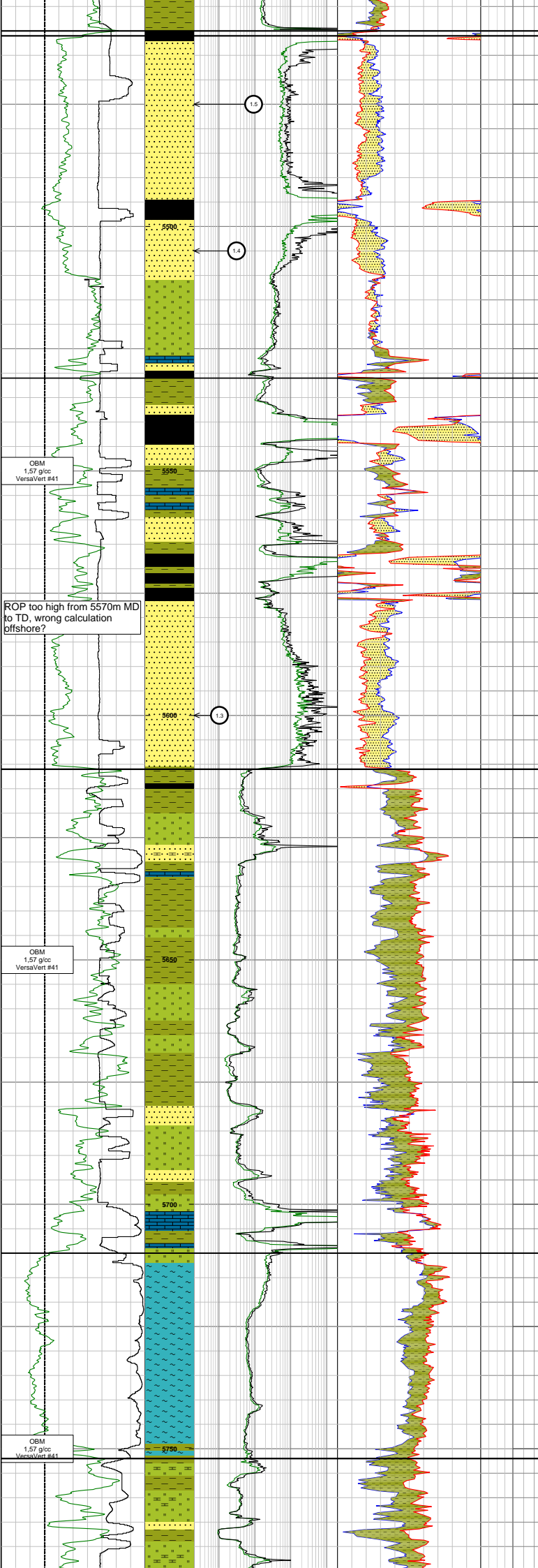
MD:5641.7m  
TVD RKB:2829.1m  
Inc:96.92°  
Az:54.71°  
DLS: 4.93°

MD:5668.9m  
TVD RKB:2826.1m  
Inc:95.67°  
Az:51.05°  
DLS: 4.18°

MD:5696.1m  
TVD RKB:2823.8m  
Inc:93.74°  
Az:47.82°  
DLS: 4.26°

MD:5723.4m  
TVD RKB:2822.3m  
Inc:92.67°  
Az:45.06°  
DLS: 3.29°

MD:5750.8m  
TVD RKB:2821.7m  
Inc:89.97°  
Az:41.50°  
DLS: 4.82°



Ness Fm. 5460,m MD / 2848,3m TVD RKB Ness-3

**Tarbert Fm. Fault/Tarbert 1**  
5461,m MD / 2848,m TVD RKB

COAL: blk, blk, mod hd

SST: lse qtz, clr - tmsl, med - crs, pred m, mod - w/ srtid.

COAL: blk, frm, v arg

SST: lse qtz, clr - tmsl, v f - m, v mic

SLTST: med lt gry, frm, blk, arg, sdy, i.p. mic, i.p. pyr, non calc

**Fault/Tarbert 2**  
5531,m MD / 2836,8m TVD RKB

COAL: blk, frm, v arg

SST: lse qtz, clr - tmsl, v f - m, occ crs

**DEN/NEU re-logged from 5552m to 5850m MD after ADN tool failure at 5552m MD**

LS: yel brn, frm, elong, microxin, i.p. dol

CLST: olv gry, dk gry - gnsh blk, frm, blk, occ elong, i.p. mic, i.p. org rich

COAL: blk, frm, v arg

SST: lse qtz, clr - tmsl, f - m

**Viking Group Heather Fm. (Base)**  
5611,m MD / 2832,3m TVD RKB

CLST: olv blk - med dk gry, blk, frm - mod hd, sly, non - sli calc, micropyr

SST: lt yel, clr - tmsl qtz, v f - m, dom f, mod srtid, calc cnt

LS: yel wh - lt yel brn, blk, frm, v f sd, microxin, micropyr, micromic.

CLST: olv blk - med dk gry, dsky yel brn, blk, frm - mod hd, sly, non - sli calc, loc mod - v calc, micropyr

LS: yel wh, blk, frm, v f sd, microxin, micropyr micromic, i.p. micropyr, non - sli calc, loc mod - v calc

CLST: med gry - olv blk - blk, dsky yel brn, blk - sbbly, frm - mod hd, sly,

SST: lse qtz, clr, f - m, occ crs

LS: yel wh - gry wh, blk, frm, v f sd, microxin, micropyr

**Cromer Knoll Gp. (Base)**  
5710,m MD / 2823,m TVD RKB

SLTST: olv blk, frm, sbbly, micromic, non calc

LS: yel wh - v pl om, frm, pred sbbly, microxin, r sdy

**Drilling stratigraphically downwards**

**Viking Group Heather Fm. (Top)**  
5752,m MD / 2821,7m TVD RKB

SLTST: brn blk, frm, sbbly, sdy, i.p. grad to sly sst, non calc, occ org rich, i.p. sly, non calc, loc sli - mod calc

Tr Pyr nods

MD:577.8m  
TVD RKB:2822.4m  
Inc:87.08°  
Az:37.96°  
DLS: 5.08°

MD:5804.9m  
TVD RKB:2824.9m  
Inc:82.32°  
Az:22.19°  
DLS: 8.25°

MD:5831.0m  
TVD RKB:2828.3m  
Inc:82.75°  
Az:27.24°  
DLS: 5.67°

MD:5848.3m  
TVD RKB:2830.3m  
Inc:84.10°  
Az:24.89°  
DLS: 4.98°

MD:5875.6m  
TVD RKB:2833.0m  
Inc:84.36°  
Az:20.87°  
DLS: 4.18°

MD:5902.7m  
TVD RKB:2835.6m  
Inc:84.96°  
Az:17.05°  
DLS: 4.26°

MD:5930.1m  
TVD RKB:2838.2m  
Inc:84.12°  
Az:13.06°  
DLS: 4.45°

MD:5958.2m  
TVD RKB:2841.2m  
Inc:83.49°  
Az:8.64°  
DLS: 4.74°

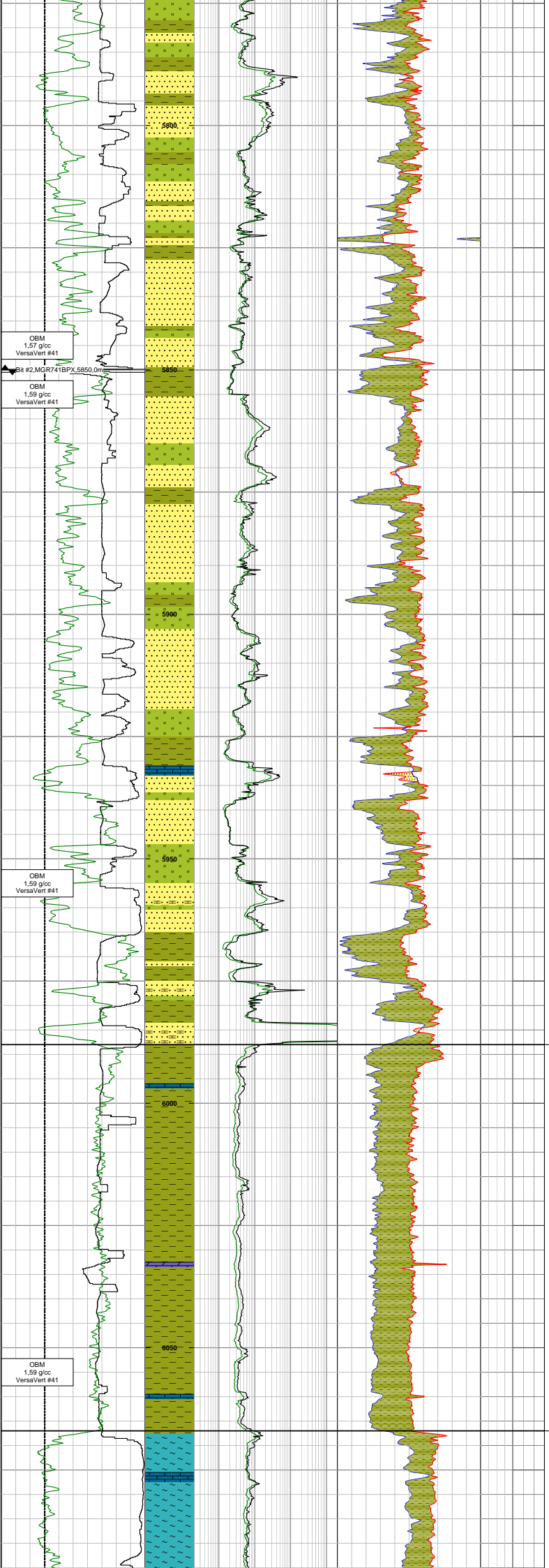
MD:5985.0m  
TVD RKB:2844.1m  
Inc:84.27°  
Az:5.22°  
DLS: 3.91°

MD:6012.2m  
TVD RKB:2846.7m  
Inc:84.64°  
Az:1.95°  
DLS: 3.61°

MD:6039.9m  
TVD RKB:2849.4m  
Inc:84.07°  
Az:358.02°  
DLS: 4.28°

MD:6067.1m  
TVD RKB:2852.3m  
Inc:83.67°  
Az:353.16°  
DLS: 5.34°

MD:6093.5m  
TVD RKB:2855.1m  
Inc:84.27°



CLST: rd bm - dsky yel brn, olv gry - olv blk, frm, blkly, loc micropy;

SST: pred lse qtz, cl- trnsi, f- v crs, prly strd, pred sbmdd, occ pyr ctng; tr aggr, gry wh, frm, v f, loc slty, arg mtvx

SST: pred lse qtz, cl- trnsi, occ mlky wh, occ bm stain, f- v crs, pred f- m, mod- prly strd, pred sbmdd, occ mdd, occ pyr ctng; tr aggr, lt gn gry, v f, arg mtvx

CLST: mod-dsky bm, also olv gry-olv blk, dk gry, frm, subblky, ip slty, ip carb, loc micropy, non-sl calc, occ mod calc

LST:yelsh wh, lt gry, frm-mod hd, blkly, sdy i/p

**Fault or BCU? (cemented)**  
**Shetland Gp. (BCU)**  
5988,m MD / 2844,4m TVD RKB

CLST: dk gry-grysh blk, frm, subblky-blky, calc

CLST: dk gry-grysh blk, frm, subblky-blky, calc

**Cromer Knoll Gp.**  
6067,m MD / 2852,3m TVD RKB

LST:yelsh gry, mod hd, blkly, microxln

DLS: 0.69°

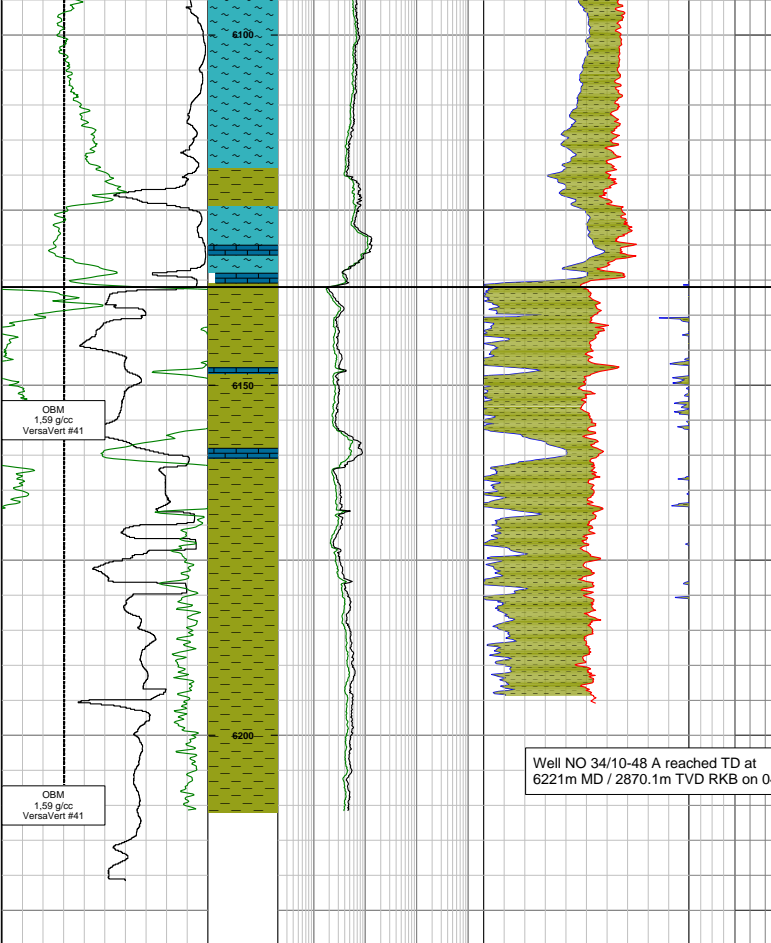
MD:6121.0m  
TVD RKB:2857.8m  
Inc:84.41°  
Az:353.33°  
DLS: 0.34°

MD:6148.4m  
TVD RKB:2860.5m  
Inc:84.27°  
Az:353.38°  
DLS: 0.63°

MD:6175.8m  
TVD RKB:2863.8m  
Inc:82.14°  
Az:350.32°  
DLS: 3.99°

MD:6203.0m  
TVD RKB:2867.5m  
Inc:81.85°  
Az:351.46°  
DLS: 0.67°

MD:6221.0m  
TVD RKB:2870.1m  
Inc:81.85°  
Az:351.46°  
DLS: 0.00°



LST: yelsh wh-yelsh gry, also mod brn, frm-mod hd, biky, occ sdy, calcenic  
CLST: mod-dsky brn, also grnsh gry, sft-frm, biky, shy, calc  
Tr, SD: lse qtz, cl-trmsl, pred crs, mod strd, pred subang

Viking Gp. (BCU) Heather Fm.  
6136,m MD / 2859,3m TVD RKB

LST: yelsh wh ? lt gry, occ mod brn, frm ? mod hd, biky, occ sdy, sideritic  
CLST : mod ? dk gry, occ biky, frm ? mod hd, occ carb, gen biky, non calc, tr m  
SD: clr qtz, lse, crs ? v crs, sbmd ? sbang, mod strd

CLST: tr lat, tr sd else a/a

SYSTEM	SERIES	STAGE	GROUP	FORMATION	DIRECTIONAL SURVEYS	LITHOLOGY	RESISTIVITY	NEUTRON/DENSITY	CAVINGS ANALYSIS	HYDROCARBON SHOWS	LITHOLOGICAL DESCRIPTION	SONIC
					0 GR apt 150 7 BS in 12 5 CAL in 26 100 ROP 0	0.2 Resistivity Med. (shallow) ohmm 2000 0.45 0.2 Resistivity Med. (medium) ohmm 2000 1.95 0.2 Resistivity Med. (deep) ohmm 2000 0.2 Resistivity Deep ohmm 2000	NEU frac -0.15 DEN g/cc 2.95 DENC g/cc -0.5 0.5	Cavings Volume 0 % 20 Spillened sand/Blocky	0 TGAS % 10 140 SONIC us/ft 40			

Test Results

Run No.	Point No.	Depth MD (m)	Depth TVD RKB (m)	Formation Pressure (Bar)	Hydrostatic Pressure Before (Bar)	Hydrostatic Pressure After (Bar)	Mobility (md/cP)	Sample	Formation	Comments
1	1	5428.7	2855.6		458.5	455.5		No	Tarbert 1	TST6, No seal
1	2	5429.2	2855.5	419.15	459.2	456	455.4	No	Tarbert 1	TST6, very good
1	3	5690.0	2833.2	417.96	458.8	454.5	2841	No	Tarbert 2	TST6, very good
1	4	5505.0	2839.2	418.38	459.2	454.8	396	No	Tarbert 1	TST6, very good
1	5	5475.0	2844.8	418.72	455.8	455.8	325	No	Tarbert 1	TST6, very good

Core No.	Drilled Depth		Recovery		Formation	Comments
	Top MD (m)	Base MD (m)	(m)	(%)		

Run	No.	MD (m)	TVD RKB (m)	Recovery	Summary / Descriptions