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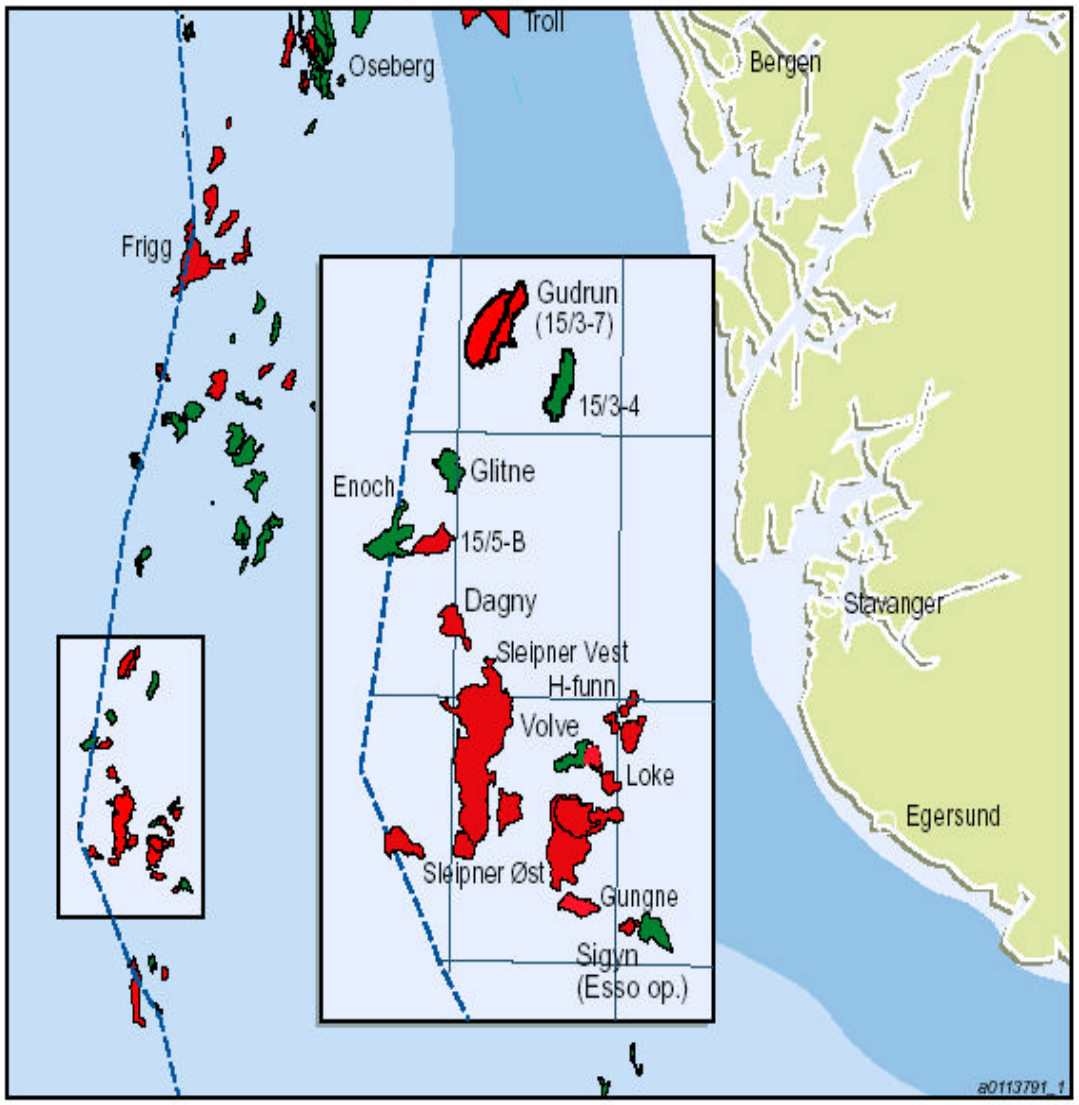

Final Well Report
Well 15/3-7
PL025/PL187

MARATHON

bp

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FINAL WELL REPORT
WELL 15/3-7
PL 025/PL 187

02C94*0101

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Title:
FINAL WELL REPORT **WELL 15/3-7** **PL 025/PL 187**

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Subjects:

General well information

HES&Q

Geology and formation data report

Drilling operations report

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1 General well information

1.1 Well data record

The well is located in the PL 025, and is a joint well between PL 025 and PL 187 with a cost split of 50/50. The licensees and the shares were changed in January 2002. Marathon entered the licenses, based on agreement with Norsk Hydro ASA (07.01.2002) and TotalFinaElf Expl. Norge AS (04.01.2002), approved by the Norwegian authorities.

License number	:	PL 025	
Licensees	:	Statoil ASA (operator)	46.8%
		BP Amoco Norge AS	25.0%
		Marathon	28.2%
License number	:	PL 187	
Licensees	:	BP Amoco Norge AS (operator)	25%
		Statoil ASA	65%
		Marathon	10%
Block number	:	15/3	
Well designation	:	15/3-7	
Classification	:	Appraisal	
Prospect	:	Gudrun	
Country	:	Norway	
Area	:	North Sea	
Drilling rig	:	West Alpha	
Water depth	:	109m	
Air gap	:	18m	
Total depth of well	:	4818 m MD RT/ 4799 m TVD MSL	
On license	:	25.04.2001	
Rig release	:	31.08.2001	
Formation at TD	:	Hugin Formation	
Surface co-ordinates	:	Latitude	58° 50' 54.6 N
		Longitude	01° 45' 08.6" E
		UTM	6 524 004 N
			428 006 E
		UTM Zone 31, CM 03°E	

Geographic co-ordinates:	Latitude	58° 50' 55.2" N
(Target - Top Hugin Fm.)	Longitude	01° 45' 08.2" E
	UTM	6 524 020 N
		428 001 E
	UTM Zone 31, CM 03°E	

Datum/Spheroid : ED50/Int. 1924
Seismic location : MC3DQ15, Inline 1064, Crossline 1665

All depths in this report are in meters measured depth (MD) with drill floor (RT) as datum unless otherwise stated.

PL025 / PL187
Well 15/3-7, Gudrun
Index map

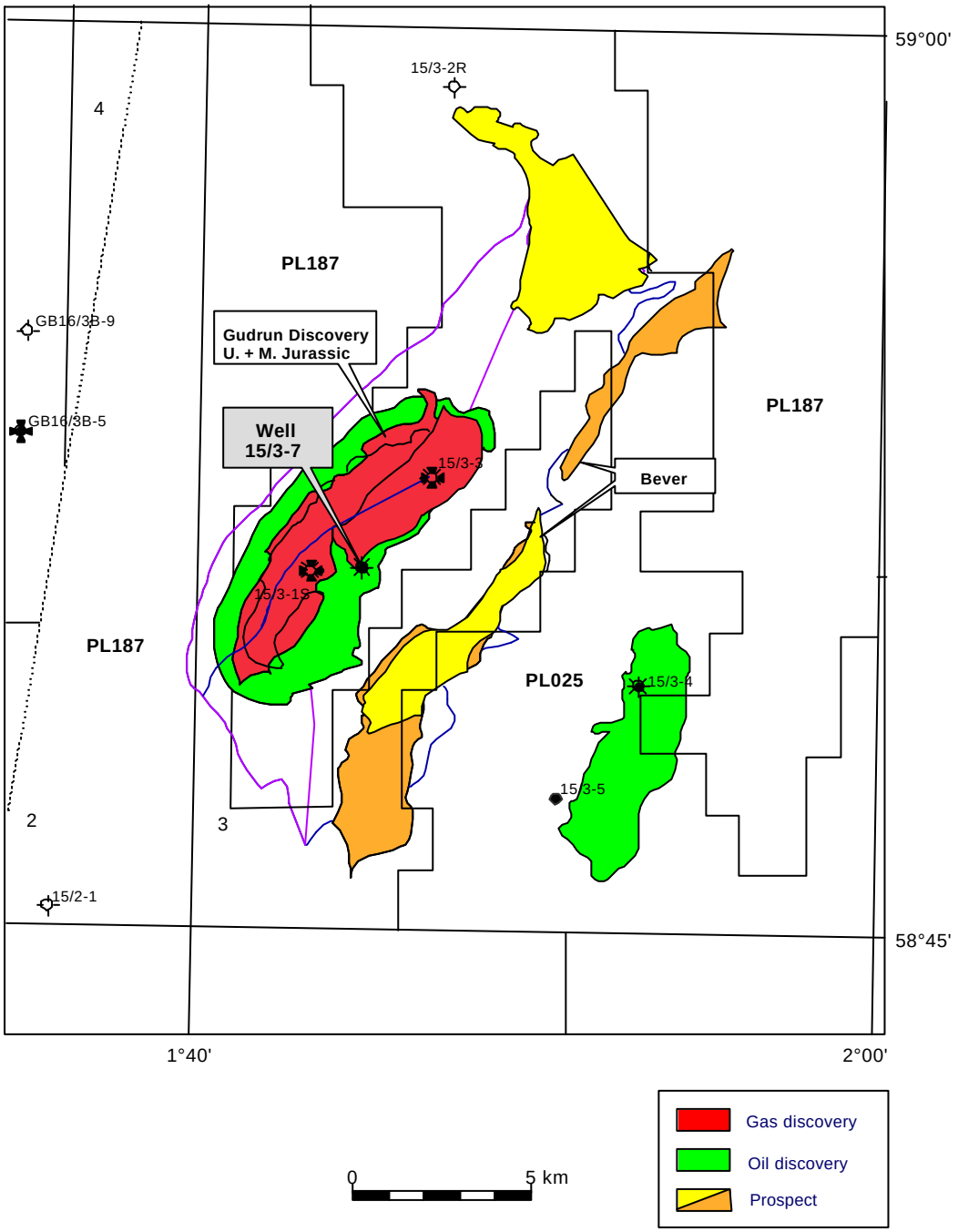


Fig. 1.1

1.2 Purpose of the well

The main objective of well 15/3-7 was to improve the data quality related to formation pressure, fluid properties and other reservoir parameters in the Hugin Formation in the Middle Jurassic.

The secondary objectives were to explore possible reservoir sands in the Upper Jurassic and the hydrocarbon phase of any proven hydrocarbons.

1.3 Results of the well

The upper part of the Hugin Formation was found water-bearing as confirmed by a water sample from the Hugin 1 sandstone at 4610m. No pressure gradients could be obtained from the Hugin Formation.

In the lower part of the Hugin Formation, no sample or pressure data could be obtained. However, sandstones are gas filled based on logs, with a likely GWC at 4787m.

A MDT sample from 4224 m in the Draupne Formation proved light oil. Pressure gradients from the Draupne Formation indicate no communication between the oil- and water-bearing zones.

The well was drilled to a total depth of 4818 m / 4799m TVD MSL, 211 meters into the Hugin Formation.

1.4 Well history

A summary of the performed coring, logging and sampling for well 15/3-7 is given in Figure 1.2.

1.4.1 Casing

Table 1.4.1.1

Casing	Shoe depth (m)	LOT / FIT (Equivalent Mud Weight)
30”	188	
20”	940	LOT 1.87 sg
13 3/8”	2682	FIT to 1.67 sg
9 7/8”	3990	FIT to 2.08 sg

1.4.2 Conventional cores

Table 1.4.2.1

Core No.	Cored interval (m)	Rec. (m)	Rec. (%)	Depth shifted to Log depth (m)	Comments
1	4609 - 4616.5	6.8	90.7	-1.0	27 m barrel. Bit ringed out due to junk and caused jamming. Connection between catcher and shoe was backed off, and core fell into outer barrel and was stopped by protector.
2	4616.5 - 4619	1.0	40	-1.0	54 m barrel. Bit ringed out due to junk and caused jamming.
3	4620 - 4635	13.1	90.3	-0.5	54 m barrel. Core jammed in carbonaceous claystone.
4	4643 - 4670	25.8	92	-0.5	27 m barrel. Connection between catcher and shoe was backed off.

1.4.3 Side wall cores

Two MSCT run (drilled plugs) and one CST run (conventional sidewall cores) were performed at TD. For the first MSCT run, 21 cores were recovered, mainly in sandstone. The main objective for these was to obtain plugs for porosity and permeability measurements. The CST run was a misrun, and resulted in a second MSCT run, where 28 cores were recovered.

1.4.4 Mud logging

A standard North Sea Mud logging unit, running Baker Hughes Inteq DrillByte v2.3.0 RO software was used for the well (details in the “End of Well Report” from BHI).

The total gas measurements were accomplished by using a Flame Ionisation Detector (F.I.D.) that records the amount of gas in equivalents to methane in air. The breakdown of the gas values was done using a F.I.D. chromatograph.

1.4.5 Logging

1.4.5.1 Electrical logging

Table 1.4.5.1

Run No.	Interval (m)	Tool combination	Comments
1A	3709 - 1050	VSP-GR	See chap. 1.4.6
1A	3726 - 2680	DSI-LDT-GR	DSI also logged in casing up to 2171m
2A	4778 - 3922.6	AIT-DSI-GR-EMS-ACTS	Logged casing shoe at 3988m
2A	4778 - 3946.9	IPLT-ACTS-GR	
2A	4777.7 - 4062.2	CMR+-ECS-GR-ACTS	Shaly interval @ 4186.7 - 4239.8m not logged
2A	4609.7 - 4773	MDT-GR	21 pressure points
2B	4073.8 - 4763	MDT-GR	51 pressure points, 2 samples
3B	4818 - 4720	AIT-IPLT-GR-ACTS	
3A	4794 - 4224	MSCT-GR	Cut 21 cores, 21 recovered. Por/perm cores.
3B	4801 - 3586	VSP-GR	See chap. 1.4.6
3A	4810 - 4707	CST-GR	Lost current on tool. 4 of 60 shots attempted, 4 lost.
3B	4047.4 - 4447	MSCT-GR	Cut 31 cores, 1 aborted due to stalling, 28 recovered.

1.4.5.2 MWD logging

Table 1.4.5.2

Run No.	Interval (m)	Collar diameter	Tool combination	Comments
1	189 - 245	9 ½"	CDR	POOH due to failure in CDR resistivity
2	245 - 897	9 ½"	CDR	Resistivity lost from 833m. High lateral vibration damaged the CDR.
3	897 - 945	9 ½"	CDR	No problems
4	945 - 1513	8 ¼"	CDR	POOH due to pressure drop. Bit and motor shaft left in hole. Erratic logs due to high vibrations from motor failure.
5	1513 - 1524	8 ¼"	CDR	No tool problems. POOH due to parted jar.
6	1524 - 1641	8 ¼"	CDR	No tool problems
7	1641 - 2554	8 ¼"	CDR	Erratic realtime data
8	2554 - 2740	8 ¼"	CDR	Erratic realtime data
9	2740 - 2743	$8^1/_4$ - $8^3/_8$"	CDR, ISONIC, CDN	Drilled cement. POOH due to poor LOT and need to do a squeeze cement job.
10	2743 - 2777	$8^1/_4$ - $8^3/_8$"	CDR, ISONIC, CDN	POOH due to no progress and probable hanging up of stabilizers inside bottom casing fish ca. 2740 m
11	2777 - 2792	$8^1/_4$ - $8^3/_8$"	CDR, ISONIC	Laid out CDN tool and 12 1/4" ISONIC stabilizer
12	2792 - 2819	$8^1/_4$ - $8^3/_8$"	CDR, ISONIC	No tool problems
13	2819 - 3627	$8^1/_4$ - $8^3/_8$"	CDR	Laid out ISONIC and Vertitrack. Packed rotary BHA.
14	3627 - 3627	$8^1/_4$ - $8^3/_8$"	CDR	POOH due to MWD negative response at shallow hole test (0 m drilled)
15	3627 - 3722	$8^1/_4$ - $8^3/_8$"	CDR	Junk marks in the stabilizers and the MWD

Run No.	Interval (m)	Collar diameter	Tool combination	Comments
				PowerPulse collar
16	3722 - 3996	$8^1/_4$ - $8^3/_8$"	CDR	No problems
17	3954 - 4063	6 ¾"	Vision	Had to downlink the signals to the tools to a lower data rate four times
18	4063 - 4063	6 ¾"	RAB+Vision	POOH at 2360m due to plugged nozzles
19	4063 - 4076	6 ¾"	RAB+Vision	The RAB tool gave erratic and too high resistivity readings. ECD stopped working halfway.
20	4076 - 4079	6 ¾"	RAB+Vision	The RAB tool gave erratic and too high resistivity readings. ECD did not work. Junk marks on BHA.
21	4079 - 4185	6 ¾"	RAB+Vision	The RAB tool gave erratic and too high resistivity readings. ECD did not work.
22	4185 - 4260	6 ¾"	RAB+Vision	The RAB tool gave erratic and too high resistivity readings. Else ok.
23	4260 - 4349	6 ¾"	Vision	No tool problems
24	4349 - 4465	6 ¾"	Vision	Turbine run, some problems with decoding due to pump noise, else ok.
25	4465 - 4545	6 ¾"	CDR+RAB	The RAB tool gave too high resistivity readings. Else ok. POOH due to high overpull. Reamed the 20m gap on log due to turbine on run 24, while pumping out.
26	4545 - 4609	6 ¾"	CDR+RAB	No problems
27	4635 - 4643	6 ¾"	CDR+RAB	Reamed cored interval (4609 – 4635m). Attenuation resistivity failed when reaming at 4619m. No RAB memory data due to battery failure. A used battery was on the tool.
28	4670 - 4755	6 ¾"	CDR	Reamed and logged from 4605m (included two cored intervals)
29	4755 - 4778	6 ¾"	CDR	No problems
30	4778 - 4818	6 ¾"	CDR	Problems with depth control. Also Anadrill could not display logs on screen

1.4.6 Velocity survey

The Zero Offset VSP was acquired in two runs, one look ahead VSP in the12 1/4" section and one run at TD. The seismic source employed for the survey, was three Bolt Airguns with a total volume of 465 cu. ins, depth 4 m and air pressure 2000 psi. The near field monitor hydrophone was kept at an offset of 4 m. See Read VSP report for further details.

The look ahead VSP was performed to optimise the setting depth of the 9 7/8" casing by reducing the uncertainty of base Cretaceous. The uncertainty was reduced from +/-80 m to +/-5m.

The VSP survey was shot from 3709 m to 1050 m in run 1A and from 4801 m to 3586 m in run 3B. In splice of the two datasets, the overlapping levels, from 3709 to 3579 m (run 1A), were omitted. A summary of the spliced runs of the Zero Offset VSP is given in Table 1.4.6.1.

Table 1.4.6.1

Interval (m)	**Spacing (m)**	**No. of levels**
1050 - 3449	~ 100	25
3449 - 3569	9 - 10	12
3569 - 4801	14 - 16	82

1.4.7 Sampling programme

One bulk sample, and one washed and dried sample were collected every 10 m from the 20" casing shoe at 940 m and down to TD of the 12 ¼" section at 3990 m. For the 8 ½" section, the sampling, frequency was increased to 3 m intervals.

1 litre mudsamples were taken every 200 m in the 17 ½" and 12 ¼" sections. For the 8 ½" section, the sampling interval was 20 m.

PL 025/PL 187

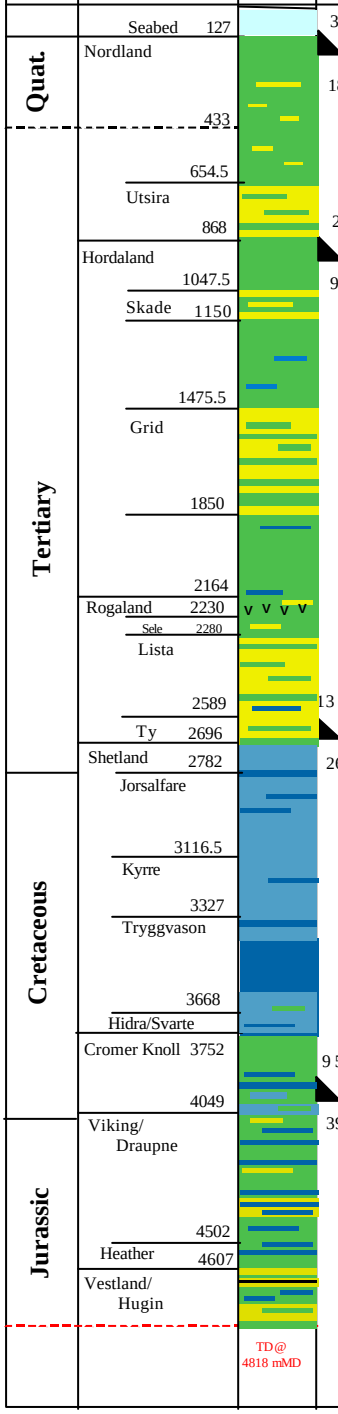
RT – Sea: 18m

Water depth: 109m MSL

Well 15/3-7 Formation evaluation

STATOIL

Made by: IW/JEH | Date: 18.12.01



Coring programme	Sampling programme	Logging programme
		MWD: GR, Resistivity, Directional, Ann. pressure
	One bulk and one washed and dried sample every 10 m down to TD of 12 ¼" section 1 lt. mudsamples every 200 m	**MWD:** GR, Resistivity, Directional, Ann. pressure
		MWD/LWD: GR, Resistivity, Directional, Ann. pressure Sonic 2740-2819m, Density 2740-2777m **Wireline run 1:** (at 3721m) VSP look-ahead Sonic, Density
Four cores in the Hugin Fm. from 4609 to 4671 m, total rec. 46.7 m	One bulk and one washed and dried sample every 3 m in 8 ½" section down to TD 1 lt. mudsamples every 20 m	**MWD/LWD:** GR, Resistivity, Directional, Ann. Pressure, RAB **Wireline run 2:** (at 4778m) Caliper, Resistivity, Sonic, GR Density, Neutron, Spectral GR CMR+, ECS MDT pressure and sampling **Wireline run 3:** (at TD=4818m) Resistivity, Density, Neutron VSP, Sidewall cores

Fig. 1.2

2 Exemptions and non-conformances

Table 2.1 Exemptions from Statoil's requirements

Exemption No.	Exemption from	Description
No.1	TB-10-15	External pressure profile for 13-3/8" casing
No.2	TB-10-15	External pressure profile for 9-7/8" casing in drilling phase
No.3	TB-10-15	External pressure profile for 9-7/8" casing in DST phase
No.4	KP-10/K-410 (4.3.2)	Too low kick tolerance when drilling 8 ½" section due to low FIT

3 Health, safety, environment and quality (HSE&Q)

To increase focus on health, safety, environment and quality, the following well specific HSE&Q goals were identified prior to the well operation:

- No incident due to lack off communication in the HPHT phase during the drilling operation
- No injury during lifting operations
- No obstructions in escape ways
- Perform detailed planning of all operations prior to spud
- Correct and timely mobilise all equipment

3.1 RUH

During the operation a total of 579 RUH (Rapport om Uønskede Hendelser) were obtained.

3.1.1 Comments to RUH

Kind of incident	Numbers	Comments
Personal injury	1	Lost time accident (LTA)
	4	Medical treatment
	2	First aid
Environment injury	2	Spill to external environment
Seriously injury	6	Injuries with RF>50
Investigated injury	1	Authority notified
	2	Internal investigation

3.2 Experience listing

System / event	D-time hrs	Experience	Immediate solution	Solution recommended	Ref.
36" section					
Guide base		The guide base was sent directly from another rig to West Alpha without being checked on base. Out on the rig the bull eyes didn't show the same position.		Calibrate bull eyes onshore prior to each job.	
26" section					
26" bit lost in hole	19.5	During drilling a sudden decrease in the pump pressure from 225 to 160 bar was observed. At the same time a reduction in the ROP was seen. Considerable stick-slip readings were measured downhole by the MWD over the last part of the run (in the Utsira sand). Reacted by reducing RPM.	No leakage was found when pressure testing the surface equipment. The pressure drop corresponded with the theoretical pressure drop of an unplugged nozzle. Bit balling was thought to be the reason for the low ROP. Pills were pumped to solve the problem. After several attempts, it was decided to pull out of hole to check for any leakage in the string. The ROV observed the bit was lost in hole.	At surface it was discovered the near bit stabilizer was a melon sleeve type run upside down. The sleeve had been unscrewed from stem and moved upwards approximately 1m to pony DC connection, where it was stuck. Quality assurance of premade assemblies must be improved.	Synergi 89916
26" bit lost in hole	Positive outcome	Instead of sidetracking the well above the lost bit, it was decided to attempt forcing the bit into the loose/soft Utsira sand.	Drilled and worked the lost bit from 897 m, using low RPM on the string. Passed the lost bit at 903 m. Did never meet obstruction from the bit after this.	As done, especially if casing wear concerns (HPHT wells, production wells etc.).	Synergi 89916
CDR failure	9	When starting drilling formation below the 30" conductor, the resistivity measurements were erratic (only showing a few intermittent correct values).	Decided to pull out of hole to change to the backup CDR tool.		Synergi 90030
17 1/2" section					

System / event	D-time hrs	Experience	Immediate solution	Solution recommended	Ref.
VertiTrak twist-off	87.5	The VertiTrak mud motor drive shaft (rotor) twisted-off, with the remaining part of the motor and the bit lost in hole.	Managed to fish all out with a tandem 5 7/8" grapple, modified in the top (welded on pieces of steel to reduce the ID of the grapple).	The VertiTrak extreme motor in conjunction with a PDC bit is not a suitable combination. Hence, VertiTrak shall not be used in combination with a PDC bit in the 17-1/2" section. It should only be used in special cases where a complete vertical well is required, and preferably only in sliding mode.	Synergi 89904
Lack of fishing drawings and tools	2 fishing misruns, approx. 27 h	When the VertiTrak was lost in hole, the supplier quoted the wrong OD (5 1/8" vs correct 6,02") of the fishing neck on the rotor left in hole. Based on this, the fishing BHA was equipped with 5" grapple. Just before tagging the fish, it was discovered that the operator had been given wrong information regarding the OD. While waiting on detailed tool drawings of the VertiTrak, another unsuccessful attempt of fishing the parted motor was performed with 6" grapples.		Ensure fishing drawings are provided by the supplier when newly developed tools are used. In addition, the supplier should ensure compatible fishing tools are available and on the rig.	Synergi 89908/ 89910
Balling problems		When drilling the upper part of the 17 1/2" section with an insert bit, sudden bit balling was experienced with the WOB exceeding 10 tons (narrow window between good progress and bit balling). The ROP dropped from 10-15 to 2-3 m/hr with too high WOB.	As bit balling was recognized related to the WOB, the weight was kept below 10 tons trying to avoid any further balling. Implemented the following practice when the bit was balled: Lift off bottom and spin for 5 minutes. Pump as fast as possible. This cured the problem, and pumping of any KCl brine/glycol based balling pill seemed not to be necessary.	As performed.	

System / event	D-time hrs	Experience	Immediate solution	Solution recommended	Ref.
Failed to set 13 3/8" seal assy	12	The ABB MS SG-TPR seal failed to reach the final land off shoulder on the 13 3/8" hanger, before it was activated and set. All pressure tests were OK. The failure was first discovered when the running tool was laid down (PADPRT) on deck, being prepared to backload. No marks were found when inspecting the lead pins/impression block on the running tool.	The seal assy was pulled, managing to recover all. Prior to setting a new seal, the hanger area was cleaned using a clean and flush tool. Ran seal assy again, and got all indications that the seal was properly set in place.	Always ensure the hole is clean prior to setting the seal (before the cmt. job), especially for 13 3/8" jobs (large annulus, low velocity).	Synergi 90645
Poor cement job -> negative FIT test -> backed off/parted csg	90.5	The plan was to perform an FIT test to 1.73 sg. The test was repeated 3 times with different pump rate, all without success. Two cement squeeze operations were performed. When drilling out the cement, the bottom 51 m of the casing was found backed off. For this reason, 2682 m was defined as the casing shoe - from a casing integrity point of view.	A channel in the cement behind the casing was suspected. Performed shoe squeeze twice. After the second squeeze a successful FIT to 1.67 sg was achieved.	Make sure the well is circulated clean before start of cement job. During the displacement after the cement job, a lot of cuttings came over the shakers. Perform pressure tests of casing either at plug bump or after the cement has set properly up. If poor cement is suspected behind shoe track, drill out the shoe with a tricone bit instead of a PDC to reduce the torque.	Synergi 91783
12 1/4" section					
Drilling with roller reamers		The erratic torque problems experienced in the upper part of the section, totally disappeared when incorporating roller reamers in the BHA.		Use roller reamers in similar applications.	
Overall mud performance and use of centrifuge		The section went very well, shakers and centrifuge worked very well. Without the centrifuge extra chemicals would have been required to maintain the mud, causing extra costs.		Use centrifuge in similar applications.	

System / event	D-time hrs	Experience	Immediate solution	Solution recommended	Ref.
Running 9 7/8" x 9 5/8" casing	6.5	Problems with the elevator and lifting sub, OD of lifting sub too big to go through the elevator.	Two lifting subs modified in workshop. Skirt/guide underneath the elevator was removed. The elevator did not work properly. Indication light in the doghouse did not work. Changed out elevator with 500 ton elevator.	Both ID and OD should be measured onshore. Lifting subs should be checked and QC'ed before sending out.	
8 1/2" section					
MWD decoding problems	7.5	The MWD tool was ordered with a low flow kit, pulsing in the range from 950 to 1700 lpm. Prior to drilling out of the shoe track, the tool was found set up to pulse in a range from 1200-1700 lpm. The Modulator gap should have been set as low as possible, to 0.07" (not as it was set to 0.09").	Due to decoding problems (also in the range the tool should be working), it was tried to decrease the transmission rate. This was done by a "down linking" procedure, varying the RPM's. Finally managed to establish decoding at 1130 lpm.	Better routines (for instance use of check lists) to avoid similar problems on other wells.	
MWD PWD sensor problem		On the second run the PWD sensor failed. Read 4.2 sg EMW ECD. The bit was pulled, and the card for the sensor was replaced. The tool was re-run, and the same problem occurred i.e. the tool had a malfunction.	Continued drilling with 1250 lpm. This has proven on previous runs to give an ECD of < 2.06 sg. The MWD tool was replaced on the next run.		
Split of TILS (telescopic low invasion shoe) while laying down the core	4	Core run#1: When soft breaking the TILS and the inner barrel, the bottom part fell off and the 6.8 m core landed in the protector on the outer barrel (the core head had been laid out). The core was not damaged. Core run#4: As learning from core run#1, the connection on the lower TILS shoe was backer locked. Even then, while laying down the core - the lower shoe had again backed off. Consequently the core was laying loose in the core head.		"Baker lock" both the TILS connections, especially in HPHT applications. In addition, check/test whether left hand threads are the best for this connection.	Synergi 94493/ 95313

System / event	D-time hrs	Experience	Immediate solution	Solution recommended	Ref.
Safety joint on coring assy		When making up the aluminum inner tube in the coring assy prior to core run #2, it was impossible to turn the adjustable device for setting the gap between the shoe and the internal lip in the core head. The same occurred also when making up the coring assy prior to core run#3.	Laid out the safety joint, replaced it by a new.	Two elastomer seals are sitting above and below the threads in the safety joint. It should be evaluated to use high temperature elastomers in HPHT applications.	Synergi 94652/ 94839
Fishing run for junk		Cored from 4609 to 4616.5 m. When the core head came to surface, junk marks (ring-out) were found on the core head and on the bottom stabilizer on the core barrel. Performed a fishing junk run, using reverse circulation junk basket dressed with magnet insert. The magnet came to surface, with one part of a die, 3.5 x 5 x 0.5 cm3, and some steel swarf sitting on.		In addition to the reverse circulation junk basket, also a standard junk basket should have been incorporated in the junk fishing assembly on top - in case of any non-magnetic junk in the hole (for instance inserts earlier lost in hole).	
Use of Jet pump to fish junk		After several junk/fishing runs due to junk problems in the hole, a jet jump was run - trying to "drawn in" junk from the well bore (suction principle). Had good indications that the pump worked as expected, but almost no junk was recovered when pulling the pump to surface (most likely as no more junk was left in the hole before running in with the pump).		In other applications (sand cleaning) the jet pump has proven good results. This was one of the first times the pump was used for fishing junk. It can be recommended to try the pump again for similar applications. The only weakness found in the design is the 2 7/8" eue connections.	

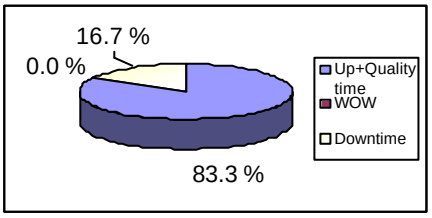
System / event	D-time hrs	Experience	Immediate solution	Solution recommended	Ref.
Junk problem	169,5	A total of 5 runs have been spent in the 8 1/2" section to recover junk lost in hole. In between the junk runs, the hole was drilled and cored - where 7 of the bits (amongst 2 core heads) pulled due to low/no penetration rate, showed junk/ring-out marks back on surface.		There was a month from the first part of a die was recovered until the last part of the die was fished to surface. Lesson learned: Be rid of a junk problem, before continue the operation.	Synergi 94327
Use of RAB tool		A RAB GR log was recorded with a distance of 1.1m above the bit, and a RAB resistivity log was recorded at the bit with a bit resistivity electrode. The intention was to use the data as an aid in picking the optimal coring point. This intention was fulfilled with respect to the GR log, which correlated fairly well with GR readings on the CDR tool. The bit resistivity data were however very erratic and spiky, and therefore of little value as background for decisions. The recorded average bit resistivity values were around 10 times higher than CDR resistivities in sections where a comparison of the general log trends could be done.		Bit resistivity data were of little value as background for decisions, due to the poor log quality. Other and much cheaper solutions should be evaluated.	
P&A					
B-spear		The seal assembly and the 9-7/8” casing were retrieved in one run using Weatherford B-spear		Use Weatherford B-spear in order to retrieve the seal assembly and 9-7/8” casing in one run.	
Cutting 13/3-8” casing		Set 13-3/8” mechanical plug and cut 13-3/8” casing in one run		In wells at shallow water depth, time can be saved when setting the 13-3/8” mechanical plug and cutting the next casing in the same run.	

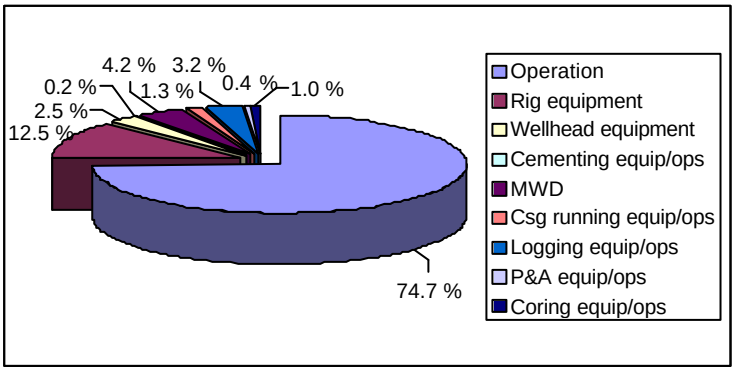
3.3 Time distribution

Distribution of down time	Hrs	Cause of waiting time	Hrs
Statoil operations	390,5	Waiting on cement for 30" conductor	7
Smedvig	65,5	Waited on Schlumberger crew (no helicopter for 2nd crew)	1
ABB Vetco Wellhead	13,0		
Halliburton cement	1,0		
Anadrill MWD	22,0		
Weatherford casing running	7,0		
Schlumberger wireline logging	16,5		
Weatherford plugging	2,0		
Security DBS coring	5,0		
TOTAL D-TIME	**522,5**	**TOTAL W-TIME**	**8**

Activity parameters	Days	Hrs	%
Planned time (1)	112,3		
Actual time (1)	130,0		
Days behind of plan (1)	17,7		
Total D+W-time		530,5	17,0
Efficiency = $\frac{TotalTime-DownTime-WOW}{TotalTime-WOW}$			**83,3**

(1) Includes time for additional scope of work (coring)





4 Geology and formation data report

4.1 Geological setting

PL 025 / PL 187, located in the central part of the Viking Graben, is situated near the UK – Norway border line, 10 km east of the Brae Field on the British shelf, and approximately 40 km to the south of the Sleipner Field.

The Gudrun Discovery is situated on the east flank of the South Viking Graben and west of the Utsira High. Gudrun is located in the Vilje sub-basin just west of the Gudrun Terrace and is an inversion structure (Fig. 4.1). A thick Upper Jurassic clastic package is deposited in the half graben of the Vilje sub-basin. This half graben developed after deposition of the shallow marine Hugin and Sleipner Formations at the same time as the Upper Jurassic sediments were deposited. The inversion of the Gudrun structure was initiated during Late Volgian. The whole Upper Jurassic package is rapidly thinning towards the Gudrun Terrace and is absent on the Utsira High (Fig. 4.2).

Well 15/3-7 penetrated sediments ranging in age from recent to Middle Jurassic (Fig. 4.3).

Structural Elements Map,
Middle Jurassic

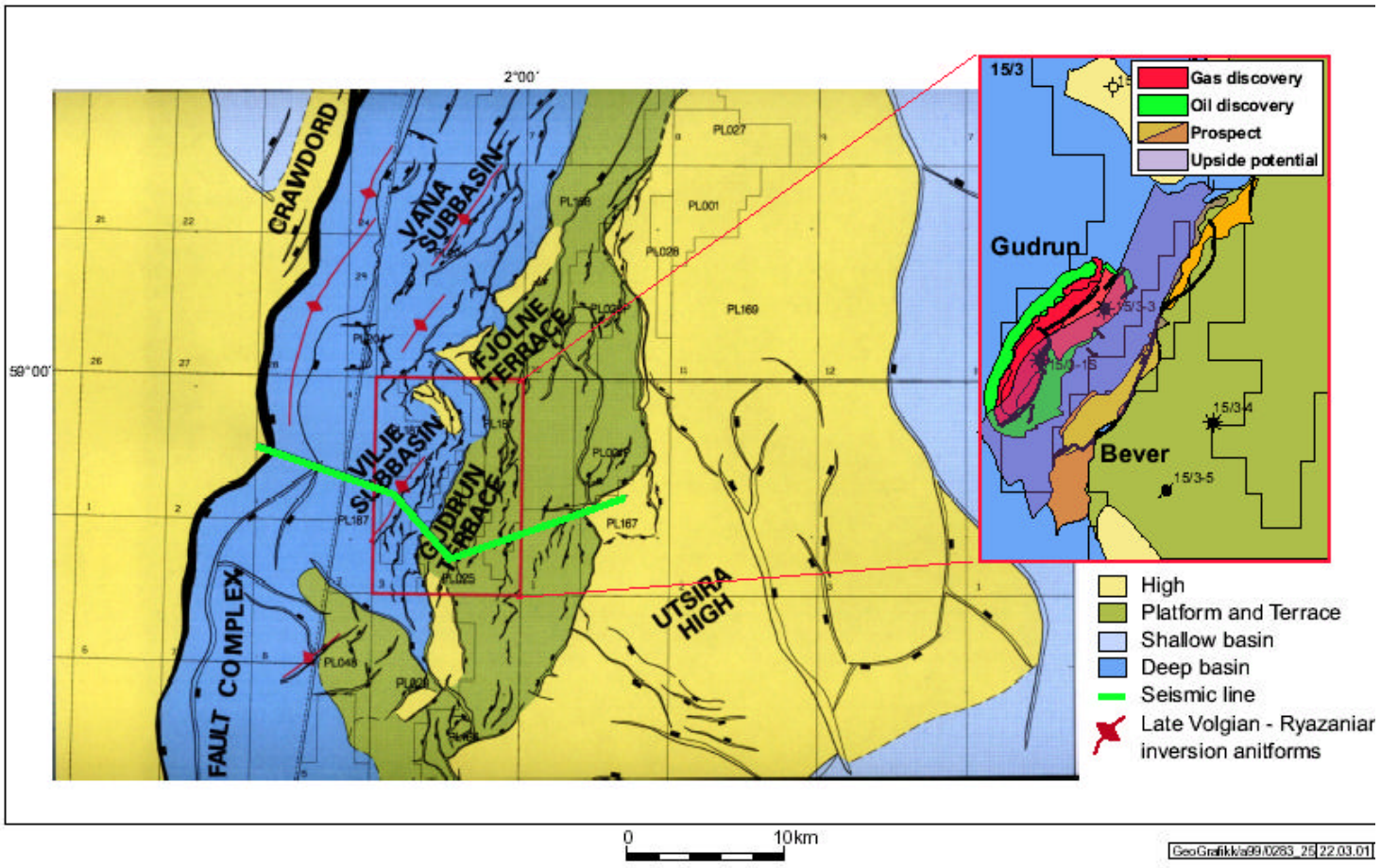
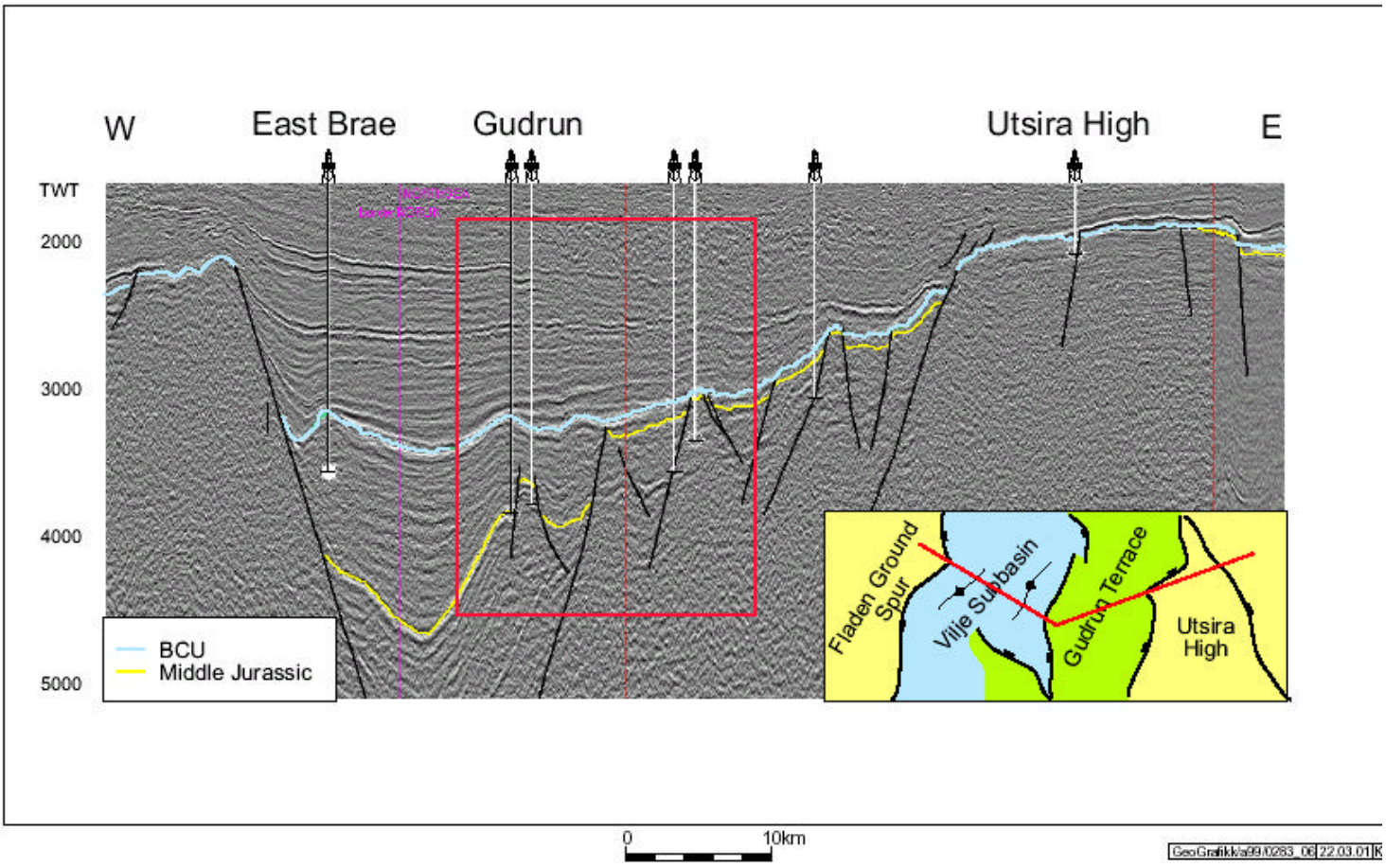


Fig.xx.x

STATOIL

Fladen Ground Spur to Utsira High



4.2 Stratigraphy

The stratigraphic succession is based on the sample descriptions, the core descriptions, the biostratigraphic report and on correlation with nearby wells.

4.2.1 Table of chronostratigraphy

Stratigraphic succession			Interval	
System	**Series**	**Stage**	**From (m)**	**To (m)**
Tertiary	Upper Oligocene		1200	1260
	Lower Oligocene		1280	1420
	Lower Oligocene – Upper Eocene		1440	1520
	Upper Eocene		1540	1580
	Middle Eocene		1600	1940
	Lower Eocene		1960	2280
	Upper Palaeocene		2300	2640
	Lower Palaeocene		2660	2760
Cretaceous	Upper Cretaceous	Upper Maastrichtian	2780	2940
		Lower Maastrichtian	2960	2980
		Campanian	3000	3200
		Santonian?	3210	3210
		Coniacian	3220	3340
		Upper Turonian	3360	3620
		Lower Turonian	3640	3660
		Cenomanian	3680	3740
	Lower Cretaceous	Upper Albian	3760	3760
		Middle Albian	3780	3830
		Lower Albian	3840	3890
		Aptian	3900	3930
		Upper Barremian	3940	3940
		Lower Barremian	3950	3950
		Upper Haterivian	3960	3970
		Upper Valanginian	3980	4030
		Lower Ryazanian	4036	4060
Jurassic	Upper Jurassic	Upper Volgian	4066.6	4078
		Middle Volgian	4048	4258
		Lower Volgian	4270	4288
		Upper Kimmeridgian	4300	4426
		Upper Oxfordian	4429	4509
		Middle Oxfordian	4509	4519
		Lower Oxfordian	4525	4549
	Middle Jurassic	Upper Callovian	4555	4585
		Lower Callovian	4591	4663.9
		Upper Bathonian	4666.55	4774

The lowest sample is from 4774 m.

4.2.2 Table of lithostratigraphy

System	Group	Formation and/or *Stratigraphic Marker*	Depth mMD MSL	Depth mTVD MSL	Depth mMD RT	Thickness mTVD	TWT * Sec	Int. Vel. m/s
Quaternary	**Nordland**	*Seabed*	109	109	127	306		
Tertiary			415	415	433	221,5		
		Utsira	636,5	636,5	654,5	213,5		
	Hordaland		850	850	868	1296		
		Top Skade	1029,5	1029,5	1047,5	102,5	1,083	*2278*
		Base Skade	1132	1132	1150		1,173	
		Top Grid	1457,5	1457,5	1475,5	374,5	1,442	*2159*
		Base Grid	1832	1832	1850		1,789	
	Rogaland	Balder	2146	2146	2164	66	2,069	*2400*
		Sele	2212	2212	2230	50	2,124	*2500*
		Lista	2262	2262	2280	309	2,164	*2699*
		Ty	2571	2571	2589	107	2,393	*2892*
	Shetland	Ekofisk	2678	2678	2696	86	2,467	*3245*
Cretaceous		Jorsalfare	2764	2764	2782	334,5	2,520	*3982*
		Kyrre	3098,5	3098,5	3116,5	210,5	2,688	*3629*
		Tryggvason	3309	3309	3327	327	2,804	*4389*
		Blodøks	3636	3636	3654	14	2,953	*3500*
		Hidra/Svarte	3650	3650	3668	84	2,961	*3429*
	Cromer Knoll	Rødby	3734	3734	3752	115	3,010	*3594*
		Sola	3849	3849	3867	28	3,074	*3733*
		Åsgard	3877	3877	3895	154	3,089	*3500*
	Viking	Draupne	4031	4031	4049	453	3,177	*3381*
Jurassic			4048,5	4048,5	4066,5		3,190	*3500*
		JVoMFS485	4052	4052	4070	25	3,192	*3125*
		JVoMFS465	4077	4077	4095	64	3,208	*3368*
		JVoMFS410	4141	4141	4159	81	3,246	*3306*
		JVoMFS395	4222	4222	4240	71	3,295	*3737*
		JKiMFS365	4293	4293	4311	97	3,333	*3660*
		JKiMFS330	4390	4390	4408	59,5	3,386	*3243*
		JOxMFS303	4450	4449,5	4468	34	3,423	*3091*
		Heather	4484	4483,5	4502	105	3,445	*3559*
		JOxMFS260	4530	4529,5	4548	59	3,471	*3576*
	Vestland	Hugin	4589	4588,5	4607	211	3,504	
		TD	4800	4799	4818			

* TWT values in the table are VSP velocity data

Table 4.1

4.3 Lithological description

The lithology in well 15/3-7 is summarized in Figure 4.3a & b.

4.3.1 General information

System, Series and Stage: Partly based on log interpretation and correlation with nearby wells.

Lithology: The lithological description is based on the cuttings and core descriptions; see Appendix E and F.

Depositional environment: Based on the biostratigraphic report and regional reports.

4.3.2 Geological Summary

HORDALAND GROUP 868.0 - 2164.0 m
850.0 – 2146.0 m TVD MSL
System: Tertiary
Series: N/A – Lower Eocene
Depositional environment: Deep water, outer shelf to upper bathyal, marine

Top of the Hordaland Group is picked at an increase in the gamma-ray response from the overlying sandstones of the Utsira Formation into claystones. The Hordaland Group consists mainly of claystones with intervals of Skade and Grid Formations, comprising varying amounts of sandstone. The tops and bases of these sandy formations are specified in Table 4.2.2. The lithologies in between these sandy sequences and below the Grid Formation are not subdivided into formations in this report, but are described as the Hordaland Group.

Down to the top of the Skade Formation the claystones are medium grey to medium dark brownish grey to olive grey, very soft to soft, slightly to mainly moderately calcareous, moderately to very silty and sandy, moderately micromicaceous and slightly to occasionally moderately glauconitic. There are also traces of micropyrite and fossil fragments.

Minor siltstones occur below 1020 m, which are medium grey, soft, slightly calcareous, moderately argillaceous, very sandy, slightly micaceous, slightly to moderately glauconitic, and with traces of carbonaceous material.

Between the Skade and the Grid Formations, the claystones are initially medium dark to dark brownish grey, soft to slightly firm, slightly to moderately calcareous,

moderately to very silty, slightly to moderately sandy, moderately to very micromicaceous and trace to slightly glauconitic, locally moderately to very glauconitic. Micropyrite occur as traces. With depth the claystones become firmer, less silty and sandy, less calcareous, but slightly dolomitic, and less glauconitic. The colour also becomes medium to dark grey to olive grey and greenish grey.

Traces of hard, slightly dolomitic, slightly argillaceous off-white to light greenish grey limestone are seen, as well as pale brown to greyish brown to brownish grey dolomites, which are poor to well indurated, in part micritic and microcrystalline, and moderately to very argillaceous, with traces of glauconite.

Immediately above the Grid Formation minor siltstones are seen, which are olive grey, soft to firm, very calcareous, argillaceous and grading to silty claystone.

Between the Grid Formation and top Rogaland Group the colours of the claystones vary between medium dark to dark grey to olive grey, occasionally olive black, brownish grey, bluish grey, and locally trace greyish brown. The claystone is soft to firm, fissile to subblocky, non to slightly calcareous, trace to slightly silty, slightly to moderately micromicaceous, and with traces of pyrite and glauconite.

Traces of light grey to mainly yellowish brown limestone also occur, which are slightly dolomitic, slightly to moderately argillaceous, with traces of micropyrite and glauconite.

Skade Formation **1047.5 - 1150.0 m**
1029.5 - 1132.0 m TVD MSL

System: Tertiary
Series: N/A
Depositional environment: N/A

The top of the Skade Formation is identified by a sharp decrease both in the gamma-ray and the resistivity log response. The base of the formation is identified by an increase in the gamma-ray and resistivity readings. The Skade Formation is predominantly composed of claystone as the overlying section, but with interbeds of sandstone. The claystones are similar to the overlying Hordaland Group, but become medium dark to dark brownish grey below 1080 m.

The sandstones are seen as loose sand, with clear to translucent and trace off-white, opaque quartz grains, which are fine to medium grained, well sorted and angular to rounded. Traces to common associated loose glauconite grains are also present. There is also localised development of white sandstone, which is soft, moderately calcareous, with very fine to fine, well sorted and angular to subrounded grains.

Grid Formation **1475.5 - 1850.0 m**
1457.5 - 1832.0 m TVD MSL

System: Tertiary
Series: Lower Oligocene – Middle Eocene
Depositional environment: Marine

The top of the Grid Formation is picked at a decrease in both the gamma-ray and resistivity log responses, while the base is picked at an increase for both the same readings. The Grid Formation is an interbedded and locally interlaminated sequence of sandstones and claystones.

The sandstones are seen as loose, clear to translucent quartz, which has traces of light red and orange staining. It is very variable in grain size, locally very fine to fine and well sorted, dominantly fine to medium with occasional to common coarse grains and also locally trace to common very coarse grains. The grains vary from moderately to mainly poorly to very poorly sorted. There are constant traces of associated loose mica, glauconite and pyrite. Traces of off-white to pale grey clean rock flour/matrix occur locally.

The claystones are medium to medium dark grey to greenish grey to olive grey, and brownish grey and bluish grey, soft to firm, fissile to subblocky, non calcareous, slightly to moderately micromicaceous, trace glauconitic, slightly microcarbonaceous. Common traces of moderately to very silty/sandy claystone also occur, which grade into argillaceous/silty very fine to fine grained sandstones.

ROGALAND GROUP **2164.0 - 2696.0 m**
2146.0 - 2678.0 m TVD MSL

The top of the Rogaland Group is identified by a trend shift in the resistivity log response to lower readings, associated with the start of a decreasing gamma-ray log response throughout the Balder Formation. The Rogaland Group is comprised of the Balder, Sele, Lista and Ty Formations in this well.

Balder Formation **2164.0 - 2230.0 m**
2146.0 - 2212.0 m TVD MSL

System: Tertiary
Series: Lower Eocene
Depositional environment: Deep marine

The Balder Formation consists of claystones with increasing amounts of tuff with depth, in addition to minor limestones and sandstones.

The claystones are medium dark to dark grey, and occasionally brownish grey and bluish grey to bluish green, soft to firm, fissile to subblocky, non to slightly calcareous, trace dolomitic, micromicaceous and trace micropyritic.

The tuffs are speckled light to medium grey to greenish grey, soft, slightly silty/sandy and non to slightly calcareous.

Limestones are seen as light grey, yellowish brown, microcrystalline, slightly dolomitic and slightly to moderately argillaceous.

The sandstones are loose, clear to translucent, very fine to fine and well sorted.

Sele Formation **2230.0 - 2280.0 m**
2212.0 - 2262.0 m TVD MSL

System: Tertiary
Series: Lower Eocene
Depositional environment: Deep marine

The top of the Sele Formation is marked by a sharp increase in the gamma-ray log response. There is an associated slight shift in resistivity readings to lower values. The Sele Formation consists of claystones with thin limestone stringers and minor sandstones near the base.

The claystones are medium dark to dark grey to brownish grey, soft to firm, fissile to subblocky, non calcareous, micromicaceous, slightly silty, trace micropyritic and microcarbonaceous. Traces of very sandy claystone grading to argillaceous sandstone are present near the base.

The description of the limestones is the same as in the overlying Balder Formation; light grey, yellowish brown, microcrystalline, slightly dolomitic and slightly to moderately argillaceous.

The sandstones are loose, clear to translucent quartz grains with traces of off-white opaque and red stain. The grain size is very fine to mainly fine to medium and trace coarse, moderately sorted with rare loose glauconite, mica and pyrite. There are also traces of off-white to pale grey, clean to slightly argillaceous rock flour/matrix.

Lista Formation **2280.0 - 2589.0 m**
2262.0 - 2571.0 m TVD MSL

System: Tertiary
Series: Upper Palaeocene
Depositional environment: Deep marine, marine

The top of the Lista Formation is picked at a shift in the resistivity trend to slightly lower values. There is a minor change in the gamma-ray log response to slightly lower values. The Lista Formation consists of interbedded sandstones and claystones.

The sandstones appear mainly as loose and clear to translucent quartz. The quartz is occasionally off-white, with traces of pink and red stain. The sandstone is very fine to coarse, though predominantly fine to medium, there is a moderate to poor sorting and the grains are predominantly subangular to subrounded. There are traces of loose pyrite, good traces of rock flour and matrix that is off-white to pale grey and soft.

The claystones are medium to dark grey, occasionally greenish grey, with traces of light to medium brownish grey. They are soft to firm, subfissile to subblocky and non to slightly calcareous in part. The claystones are moderately micromicaceous with traces of pyrite, occasionally becoming very sandy and grading to argillaceous sandstone.

Ty Formation **2589.0 - 2696.0 m**
2571.0 - 2678.0 m TVD MSL

System: Tertiary
Series: Upper Palaeocene – Lower Palaeocene
Depositional environment: Marine

The top of the Ty Formation is picked at a sharp decrease in the gamma-ray log response to a smoother, lower reading. In addition the resistivity log response shows a slight decrease and the velocity is higher than in the overlying formation. The Ty Formation consists of sandstone with a few, thin claystone stringers.

The sandstone comprises loose quartz grains that are predominantly clear, transparent, translucent and occasionally milky-white in colour. The sandstone is poorly sorted with grain size generally varying from very fine to coarse, but dominantly fine to medium. The grains are subangular to subrounded, occasionally rounded with some calcite cement, traces of pyrite, mica and glauconite. Towards the base of the formation, the sandstones become pale yellow orange to pinkish in colour.

The claystone is dark grey, dark greenish grey, occasionally dark brownish grey, light grey and rarely bluish grey in colour. The claystone is firm to occasionally hard, subblocky to subsplintery in parts and non calcareous.

Minor amounts of limestone, which is light brown to tan, angular, hard and microcrystalline, occur occasionally.

SHETLAND GROUP **2696.0 - 3752.0 m**
2678.0 - 3734.0 m TVD MSL

The top of the Shetland Group is recognised by an increase in velocity and resistivity readings and an associated decrease in the gamma-ray response, when compared to the overlying claystone of the Rogaland Group,. The Shetland Group is comprises the Ekofisk, Jorsalfare, Kyrre, Tryggvason, Blodøks and Hidra/Svarte Formations.

Ekofisk Formation **2696.0 - 2782.0 m**
2678.0 - 2764.0 m TVD MSL

System: Tertiary
Series: Lower Palaeocene
Depositional environment: Open marine

The Ekofisk Formation comprises marl with minor limestone.

The marl is pale grey to medium dark grey, becoming very pale grey to yellowish white and predominantly greyish red to pale reddish brown-pink towards the base of the section. The marl is soft to occasionally firm, rarely moderately hard. It is subblocky to amorphous and rarely grades to argillaceous limestone. Occasionally there are dark, carbonaceous microlaminas.

The limestone is white to yellowish white to very pale grey, angular to blocky, hard, brittle to crumbly in parts and microcrystalline to chalky.

Trace amounts of claystone and sandstone occur, most probably contamination from the overlying formations.

Jorsalfare Formation **2782.0 - 3116.5 m**
2764.0 - 3098.5 m TVD MSL

System: Cretaceous
Series: Upper Cretaceous
Stage: Upper Maastrichtian - Campanian
Depositional environment: Open marine

The top of the Jorsalfare Formation is recognized on the logs by a distinct increase in velocity, increasing resistivity readings, and a start of slightly decreasing gamma-ray readings. The Jorsalfare Formation comprises a long sequence of interbedded marls and limestone in varying amounts and thicknesses.

The marls are mainly medium grey to medium dark grey, but pale grey, light greenish grey and olive grey colours also occur. Towards the base of the formation pale brown and greyish brown colours occur. The marls are generally soft to firm and

occasionally moderately hard, amorphous to subblocky in shape and in parts grade into argillaceous limestone.

The limestone has an even larger span of colours ranging from white to yellowish white, very light grey to medium grey to medium dark grey and occasionally olive grey. It is predominantly firm to moderately hard but hard to very hard parts occur. It is angular to blocky in shape, and the texture goes from chalky to microcrystalline and further to cryptocrystalline. In the upper parts it can become very argillaceous and micritic, grading to marl locally with disseminated micropyrite.

Sporadically small amount of sandstone was seen (at 3070 m) as light olive grey, translucent to clear quartz, very fine to fine grained, subangular to subrounded, calcite cemented and hard, and with no visible porosity.

Kyrre Formation **3116.5 - 3327.0 m**
3098.5 - 3309.0 m TVD MSL

System: Cretaceous
Series: Upper Cretaceous
Stage: Campanian - Coniacian
Depositional environment: Open marine

A slightly higher gamma-ray level and a slightly lower velocity level when compared to the Jorsalfare Formation above, define the top of the Kyrre Formation. The Kyrre Formation comprises mainly marl with minor stringers of limestone.

The marl is light grey to medium dark grey, greenish grey to dark greenish grey and pale brown to brownish grey in colour. It is soft to firm and occasionally moderately hard, amorphous to subblocky, occasionally becomeing micropyritic and occasionally grading into argillaceous limestone.

The limestone is light grey to pinkish grey, firm to moderately hard, micritic and slightly argillaceous.

Tryggvason Formation **3327.0 - 3654.0 m**
3309.0 - 3636.0 m TVD MSL

System: Cretaceous
Series: Upper Cretaceous
Stage: Coniacian – Lower Turonian
Depositional environment: Open marine

The top of the Tryggvason Formation is recognized on the logs by a slightly higher velocity, a slightly lower gamma-ray together with a slightly increasing trend in

resistivity readings. The Tryggvason Formation comprises interbedded marls and limestones.

The marls are light grey to medium grey and occasionally medium dark grey. Light olive grey and greenish grey to dark greenish grey colours are also common, particularly in the lower part of the formation. The marls are mainly soft to firm, and occasionally moderately hard. The cuttings are amorphous to blocky and grading to argillaceous limestone in parts.

The limestone is very light grey to medium grey and occasionally medium dark grey, as well as light olive grey and occasionally greenish grey near the base of the formation. It is firm to moderately hard and blocky, with a micritic and chalky texture. It is generally slightly argillaceous, but grading to argillaceous limestone in parts. It is furthermore microglauconitic in varying amounts, ranging from rare to occasional down through the formation.

Blodøks Formation **3654.0 - 3668.0 m**
3636.0 - 3650.0 m TVD MSL

System: Cretaceous
Series: Upper Cretaceous
Stage: Lower Turonian
Depositional environment: Open marine

The top of the Blodøks Formation is defined by a slight increase in gamma-ray readings, together with a decrease in velocity and resistivity readings. The Blodøks Formation comprises glauconitic marl with a few thin limestone stringers.

The marl is light olive grey, greenish grey to dark greenish grey as well as medium grey and medium dark grey, though to a lesser degree. It is soft to firm, amorphous to blocky, argillaceous grading to argillaceous limestone in parts and glauconitic to very glauconitic in parts.

The limestone is very light grey to medium light grey and olive grey. Occasionally it is medium grey and greenish grey. It is firm to moderately hard and blocky with a micritic and chalky texture. It is slightly argillaceous to occasionally argillaceous, and glauconitic to very glauconitic in parts.

Hidra/Svarte Formation **3668.0 - 3752.0 m**
3650.0 - 3734.0 m TVD MSL

System: Cretaceous
Series: Upper Cretaceous
Stage: Cenomanian
Depositional environment: Open marine

The top of the Hidra/Svarte Formation is recognized by a sharp decrease in gamma-ray readings together with a sharp increase in resistivity and velocity readings, defining the onset of a cleaner carbonaceous sequence. The Hidra/Svarte Formation comprises mainly marl with less amounts of limestone and occasional thin stringers of claystone.

The marl is medium grey to medium dark grey, soft to firm becoming moderately hard towards the base, amorphous to subblocky and in parts grading to argillaceous limestone. Occasionally greyish brown and moderate brown colours occur.

The limestone is light grey to medium light grey, occasionally very light grey to yellowish grey. It is mainly firm, but soft and moderately hard stringers occur. It is amorphous to subblocky, micritic, microglauconitic in parts and slightly to very argillaceous, occasionally grading into marl.

The claystone is dark grey to greyish black, soft to firm, amorphous, slightly calcareous and micropyritic in parts

CROMER KNOLL GROUP **3752.0 - 4049.0 m**
3734.0 - 4031.0 m TVD MSL

The top of the Comer Knoll Group is defined by a slight increase in gamma-ray readings together with a decrease in velocity and resistivity readings, corresponding to the increasing content of argillaceous matter. The Cromer Knoll Group comprises of the Rødby, Sola and Åsgard Formations.

Rødby Formation **3752.0 - 3867.0 m**
3734.0 - 3849.0 m TVD MSL

System: Cretaceous
Series: Lower Cretaceous
Stage: Upper Albian - Lower Albian
Depositional environment: Open marine, offshore marine

The Rødby Formation is composed of interbedded claystone and marl with minor stringers of limestone.

The claystone is dark grey to olive black, soft to firm, amorphous to blocky in shape, and very calcareous in parts grading to marl. From 3830 m, the claystone also becomes pale reddish grey to greyish red and partly sticky.

The marl is predominantly dark grey to olive black, but medium grey to medium dark grey colours also occur. It is soft to firm, amorphous to subblocky and in parts grades into claystone.

The limestone is yellowish white to very light grey and firm. The cuttings are amorphous to blocky, micritic and ranging from slightly argillaceous to argillaceous.

Sola Formation **3867.0 - 3895.0 m**
3849.0 - 3877.0 m TVD MSL

System: Cretaceous
Series: Lower Cretaceous
Stage: Lower Albian
Depositional environment: Offshore marine

The top of the Sola Formation is defined by a decrease in slight increase in the gamma-ray readings, and a decrease in velocity resistivity readings. The resistivity also becomes less erratic than in the overlying Rødby Formation. The Sola Formation comprises claystone with minor stringers of limestone.

The claystone is medium dark grey to dark grey as well as pale reddish brown and greyish red. It is soft to firm, amorphous to blocky, very calcareous to calcareous, slightly sticky, silty and microglauconitic in parts.

The limestone is medium light grey and in parts light olive grey to greenish grey. It is firm, amorphous to subblocky, micritic, slightly argillaceous and in parts microglauconitic.

Åsgard Formation **3895.0 - 4049.0 m**
3877.0 - 4031.0 m TVD MSL

System: Cretaceous
Series: Lower Cretaceous
Stage: Aptian – Late Ryazanian
Depositional environment: Open marine

The top of the Åsgard Formation is defined by higher velocity readings combined with a decrease in gamma-ray and a corresponding sharp increase in resistivity readings related to the onset of a highly calcareous formation. The Åsgard Formation is composed of claystone with marl and limestone stringers.

The claystone is medium grey to medium dark grey and pale reddish grey to greyish red. It is soft to firm, amorphous to blocky and calcareous to very calcareous, occasionally grading into marl. It is occasionally microglauconitic and micropyritic and sticky in parts.

The marl is medium grey to medium dark grey, soft, amorphous to subblocky and in parts sticky as well as microglauconitic. Occasionally it grades into claystone.

The limestone is light olive grey to medium light grey, brownish grey and occasionally light yellowish brown. It is firm, blocky, micritic and slightly argillaceous to argillaceous.

VIKING GROUP **4049.0 - 4607 m**
4031.0 - 4589.0 m TVD MSL

The top of the Viking Group is defined by a distinct increase in gamma-ray and resistivity readings, together with a change in the velocity readings to distinctly lower values. The top of the Jurassic is picked at 4066.5 m (4048.5 m TVD MSL) based on biostratigraphy and log responses. In this well the Viking Group consists of the Draupne and the Heather Formations.

Draupne Formation **4049.0 - 4502.0 m**
4031.0 - 4484.0 m TVD MSL

System: Jurassic
Series: Upper Jurassic
Stage: Upper Volgian – Upper Oxfordian
Depositional environment: Marine

The Draupne Formation consists of the interbedded lithologies; claystone, limestone and sandstone with minor marl, varying in thicknesses from laminas to stringers and layers. Marl only occurs in the uppermost parts of the Draupne Formation, whilst the other lithologies occur throughout. The formation is subdivided into sequences separated by "maximum flooding surfaces" (MFS). Seven MFS are identified based on biostratigraphy, log interpretation and correlation with nearby wells. The depths of the surfaces are listed in Table 4.2.2.

In general the claystone becomes darker and more organic rich with depth. It starts off as olive grey to light olive grey and brownish black and becomes olive black to dusky yellow brown and than greyish black to black oil prone source rock in the deepest part of the Draupne Formation. It is moderately hard to hard in the upper parts, becoming firm to moderately hard in the lower parts. The claystone is occasionally silty and sandy in parts, predominantly non calcareous to occasionally calcareous and in parts becomes very calcareous grading into argillaceous limestone. It is carbonaceous to very carbonaceous throughout and slightly to commonly micropyritic. The cuttings are blocky to subfissile throughout the entire section.

Three different sandstone sequences can be distinguished within the Draupne Formation. Starting from the top, the sandstone consists of clear to translucent and

medium grey to dark grey quartz, locally also pale yellow and moderate yellow brown colours occur. The sand is often loose, very fine to fine grained, well sorted, subangular to subrounded and occasionally rounded. It is locally argillaceous to very argillaceous grading into sandy claystone. The sandstone becomes both calcite cemented as well as carbonaceous to very carbonaceous with depth.
From approximately 4258m colour changes occur. The sandstone becomes medium light grey to medium dark grey, but is occasionally also clear and translucent as above. The grains are still very fine to fine but in parts also medium to coarse, angular to subrounded and poorly sorted. The sandstone is moderately hard to hard becoming very hard. It is predominantly silica cemented, but in parts also calcite cemented and occasionally it is argillaceous and carbonaceous. Traces of pyrite occur, and overall the visible porosity is poor, occasionally fair.
Below 4390m another colour change occurs, the colours changing into light grey, olive grey and light brownish grey. The sand consists predominantly of loose grains, but silica and calcite cementation occur occasionally. The grain size is very fine to medium with occasional coarse grains. It is moderately to poorly sorted, angular to subrounded, hard to very hard, with traces of pyrite and with poor visible porosity.

The limestone is light grey to medium light grey, light yellowish grey and also light brownish grey. From 4381m a medium blue grey limestone occasionally occurs. The limestone is ranging from firm to hard, but is predominantly moderately hard. It is furthermore micritic and is slightly argillaceous to argillaceous grading either into argillaceous laminas or marl. It is slightly to occasionally moderately sandy, occasionally slightly pyretic, and in parts trace amounts of glauconite are present.

The marl is seen only in the uppermost part of the Draupne Formation. The marl is light olive grey to olive grey, firm to moderately hard, subblocky to blocky, and locally grading into argillaceous limestone.

Heather Formation **4502.0 - 4607.0 m**
4483.5 - 4588.5m TVD MSL

System: Jurassic
Series: Upper Jurassic – Middle Jurassic
Stage: Middle Oxfordian – Lower Callovian
Depositional environment: Marine, open marine

A drop in both gamma-ray as well as resistivity readings, together with a change in the velocity to higher values, defines the top of the Heather Formation. One MFS of Oxfordian age is identified within in this formation. The Heather Formation consists almost entirely of claystone with only trace amounts of limestone and sandstone.

The claystone is grey black to olive black and black, firm to moderately hard, blocky to subfissile, occasionally silty, slightly micropyritic and non calcareous.

The limestone is light to medium light grey and yellow grey to light yellow grey, moderately hard, micritic and occasionally argillaceous.

The sandstone consists of light brownish grey and clear to translucent quartz grains. The grains are predominantly loose, very fine to fine, angular to subangular and moderately to poorly sorted. The sandstone is hard to very hard with only poor visible porosity.

VESTLAND GROUP **4607.0 - 4818.0 m (TD)**
4588.5 - 4799.0 m TVD MSL

The top of the Vestland Group is defined by the first clean sandstone causing a marked decrease in the gamma-ray readings, together with a corresponding increase in the resistivity and velocity values. The Vestland Group consists of the Hugin Formation in this well. The sediments are deposited near shore in a shallow marine environment, with the occasional influence of continental fluvial-deltaic conditions which includes coaly sequences.

Hugin Formation **4607.0 - 4818.0 m (TD)**
4589.0 - 4800.0 m TVD MSL

System: Jurassic
Series: Middle Jurassic
Stage: Lower Oxfordian – Upper Bathonian
Depositional environment: Restricted marine, occasional non-marine, open marine

The Hugin Formation is made up of beds and sequences of sandstone separated by thick intervals of claystone. Layers of limestone and/or carbonate cemented and tight sandstone are frequently present. Thick layers of coal occur, particularly in the upper/middle part of the formation.

The sandstones are brownish grey and dark grey. They are medium to coarse to occasionally very coarse in the uppermost part, becoming predominantly fine to very fine to occasionally medium further down. The sandstones are moderately sorted, subround to subangular, well cemented with predominantly silica cement, but layers of carbonate cement also occur. Dark grey, carbonaceous clay matrix, often as inclusions and patches, occasionally occur together with coaly lamina and also occasionally abundant mica. In parts the sandstone grades to siltston. Commonly fair to poor visible porosity is seen in the upper part, while poor to nil visible porosity is dominating further down.

The claystones are dark grey to brown black, hard, subblocky to subfissile, slightly silty in parts, commonly carbonaceous and occasionally coaly, slightly micaceous with traces of pyrite and non calcareous.

The limestones are off-white to light brown to pale yellowish brown, firm to hard in samples, but inferred hard to very hard within the formation. Occasionally the limestones are very sandy grading to carbonate cemented sandstones.

The coal layers are black, shiny, moderately hard and brittle.

PL 025/PL 187

RT – Sea: 18m

Water depth: 109m MSL

Well 15/3-7 Stratigraphy

STATOIL

Made by: IW | Date: 17.12.01

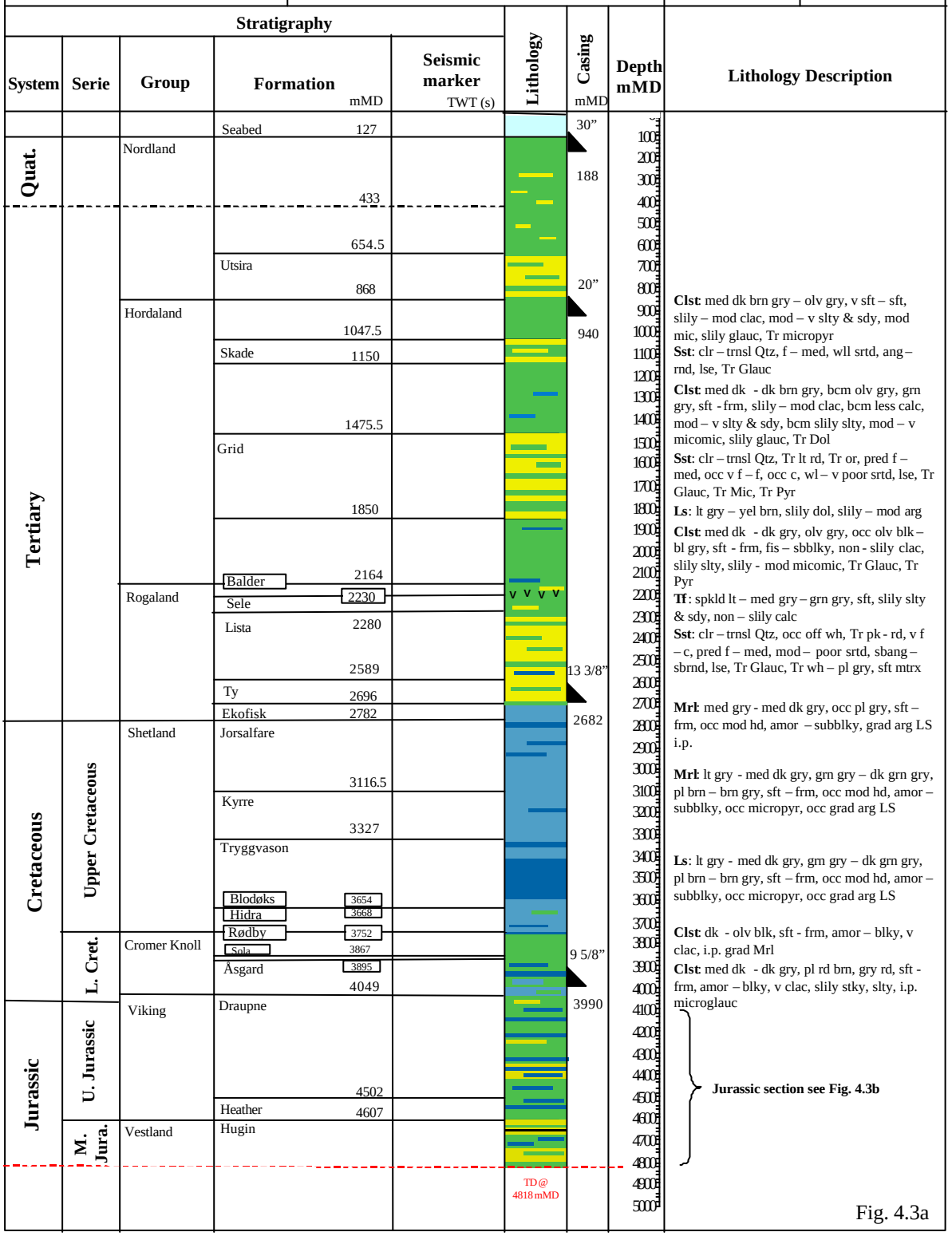


Fig. 4.3a

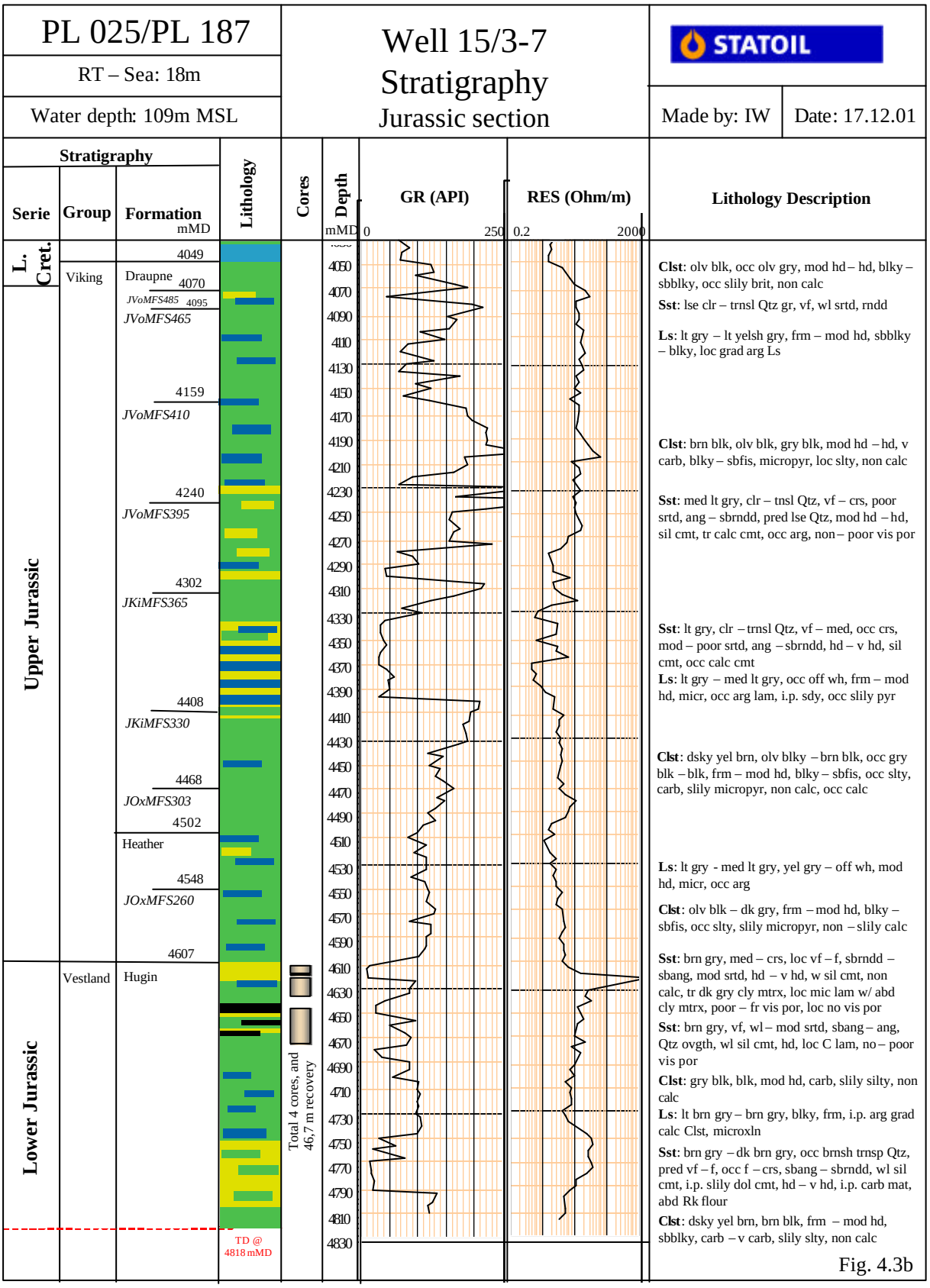

PL 025/PL 187
RT – Sea: 18m
Water depth: 109m MSL
Well 15/3-7
Stratigraphy
Jurassic section
STATOIL
Made by: IW
Date: 17.12.01
Stratigraphy
Serie
Group
Formation
mMD
Lithology
Cores
Depth
mMD
GR (API)
0
250
RES (Ohm/m)
0.2
2000
Lithology Description
L. Cret.
Upper Jurassic
Lower Jurassic
Viking
Vestland
4049
Draupne
4070
JVoMFS485
4095
JVoMFS465
4159
JVoMFS410
4240
JVoMFS395
4302
JKiMFS365
4408
JKiMFS330
4468
JOxMFS303
4502
Heather
4548
JOxMFS260
4607
Hugin
Total 4 cores, and 46,7 m recovery
TD @ 4818 mMD
Clst: olv blk, occ olv gry, mod hd – hd, blky – sbblky, occ slily brit, non calc
Sst: lse clr – trnsl Qtz gr, vf, wl srtd, rndd
Ls: lt gry – lt yelsh gry, frm – mod hd, sbblky – blky, loc grad arg Ls
Clst: brn blk, olv blk, gry blk, mod hd – hd, v carb, blky – sbfis, micropyr, loc slty, non calc
Sst: med lt gry, clr – tnsl Qtz, vf – crs, poor srtd, ang – sbrndd, pred lse Qtz, mod hd – hd, sil cmt, tr calc cmt, occ arg, non – poor vis por
Sst: lt gry, clr – trnsl Qtz, vf – med, occ crs, mod – poor srtd, ang – sbrndd, hd – v hd, sil cmt, occ calc cmt
Ls: lt gry – med lt gry, occ off wh, frm – mod hd, micr, occ arg lam, i.p. sdy, occ slily pyr
Clst: dsky yel brn, olv blky – brn blk, occ gry blk – blk, frm – mod hd, blky – sbfis, occ slty, carb, slily micropyr, non calc, occ calc
Ls: lt gry - med lt gry, yel gry – off wh, mod hd, micr, occ arg
Clst: olv blk – dk gry, frm – mod hd, blky – sbfis, occ slty, slily micropyr, non – slily calc
Sst: brn gry, med – crs, loc vf – f, sbrndd – sbang, mod srtd, hd – v hd, w sil cmt, non calc, tr dk gry cly mtrx, loc mic lam w/ abd cly mtrx, poor – fr vis por, loc no vis por
Sst: brn gry, vf, wl – mod srtd, sbang – ang, Qtz ovgth, wl sil cmt, hd, loc C lam, no – poor vis por
Clst: gry blk, blk, mod hd, carb, slily silty, non calc
Ls: lt brn gry – brn gry, blky, frm, i.p. arg grad calc Clst, microxln
Sst: brn gry – dk brn gry, occ brnsh trnsp Qtz, pred vf – f, occ f – crs, sbang – sbrndd, wl sil cmt, i.p. slily dol cmt, hd – v hd, i.p. carb mat, abd Rk flour
Clst: dsky yel brn, brn blk, frm – mod hd, sbblky, carb – v carb, slily slty, non calc

Fig. 4.3b

4.4 Hydrocarbon indications

The hydrocarbon indications are summarized in Figure 4.4.

Two sidewall cores were taken in a sandstone layer in the Draupne Formation, below the JVoMFS425. The shows in these samples are described as even, dull yellow direct fluorescence with slow streaming yellow white cut fluorescence and moderate hydrocarbon odour. No shows were observed from cuttings in the Draupne Formation. When entering the Draupne Formation and the Upper Jurassic section, the gas trend indicated a distinct change from the overlying Tertiary and Cretaceous sections, where the gas values were below 1%. The total gas values increased to an average of 2-3%, with formation gas peaks up to 7.6%. The components C_1 to nC_5 were present, where the heaviest components (nC_4 to nC_5) occured frequently and were related to the highest total gas values.

In the Hugin Formation, the shows were mainly evaluated from core samples. At the top of the Hugin Formation, from 4606 m to 4611 m, the shows appeared as patchy to spotty, moderate to yellow white direct fluorescence with moderate to fast streaming, bright yellow white cut fluorescence and patchy light brown oil stain with moderate to strong hydrocarbon odour. The clay matrix content in the sandstone increased over a 5 m interval below 4611m. The shows in this interval appeared as rare, spotty, dull yellow/blue direct fluorescence with very slow, streaming, bright yellow white to nil cut fluorescence with no stain, but with a moderate to occasionally weak hydrocarbon odour. Below 4622 m, the sandstone contained less clay matrix, and the shows were described as patchy to spotted yellow white direct fluorescence with slow to moderate streaming, yellow white cut fluorescence, patchy light brown stain with moderate to strong hydrocarbon odour and pale yellow green to blue white residual fluorescence. No visual shows were recorded in the claystones or limestone of the Hugin Formation, or in the sandstone below 4667 m. Down to approximately 4660 m, the average total gas values in the Hugin Formation was 1%, with the presence of several gas peaks up to 5%. C_1 to nC_4 components dominated in this interval, with nC_5 and iC_5 related to the highest peaks. Below 4660 m and down to TD, the average total gas value was less than 1%, with fewer gas peaks and nC_4 as the heaviest component. An exemption is the sandy intervals from 4750 m to 4785 m where higher gas peaks appeared more frequently.

27 and 25ppm H_2S were recorded while coring at 4611 m and 4619 m, respectively.

Major gas peaks are listed in the table below. For the complete gas peak list and other details, see Baker Hughes Inteq “End of Well Report”.

4.4.1 Table of major gas peaks

Depth m	Gas %	C_1 ppm	C_2 ppm	C_3 ppm	iC_4 ppm	nC_4 ppm	iC_5 ppm	nC_5 ppm	BG %	Type
1166	1,1	7546	0	0	0	0	0	0		FG
2459	1,99	15276	108	25	0	0	0	0		TG
4106	2,61	18910	1714	664	20	123	6	21	1,4	FG
4149	6,17	45712	3819	1520	48	287	18	38	1,2	FG
4150	9,35	80620	5068	1833	102	317	46	62	0,5	TG
4185	16,5	150027	8419	3046	165	506	69	90	0,2	TG
4200	19	184698	8741	2992	153	487	61	81	1	TG
4222	7,6	68346	4990	1435	83	253	34	48	3,7	FG
4233	7,6	67936	4708	1472	83	262	34	50	3,9	FG
4236	5,5	44847	3525	1154	63	218	28	42	3,4	FG
4260	14,8	135093	6823	2374	122	381	57	67	0,8	TG
4265,6	3,6	27902	2412	878	53	173	27	39	1,1	FG
4349	9,6	90337	4460	1501	77	242	33	44	0,4	TG
4412	3,84	26856	2977	931	27	73	7	22	1,7	FG
4420	4,65	32389	3729	1232	38	106	13	44	3	FG
4432	4,65	32091	3839	1289	42	113	13	53	3,5	FG
4440,7	4,5	29687	3368	1380	40	306	13	56	3,3	FG
4546	16,27	151780	7069	2359	125	389	53	72	1	TG
4614	3,6	26800	2059	703	12	114	0	0	0,5	FG
4635	8,7	82231	2680	647	32	96	12	18	0,4	TG
4639	4,8	41606	2456	463	27	54	0	0	1,9	FG
4643	19	179427	6968	2201	114	347	47	62	1,1	TG
4645	4,8	44165	2087	351	18	36	0	0	0,2	FG
4650,5	4	31926	2283	713	47	106	12	15	1	FG
4670	20,6	190715	8772	3028	166	513	72	97	0,5	TG
4715	8,16	80000	3817	1015	62	156	24	31	4	TG
4746,5	5,2	45185	2243	636	21	108	0	0	0,8	FG
4755	4,5	42242	1598	345	18	54	0	0	1	TG
4774	3,93	31903	1643	511	12	84	0	0	0,5	FG
4782	9,66	94931	3809	892	61	160	29	41	2	FG

FG = Formation gas
TG = Trip gas

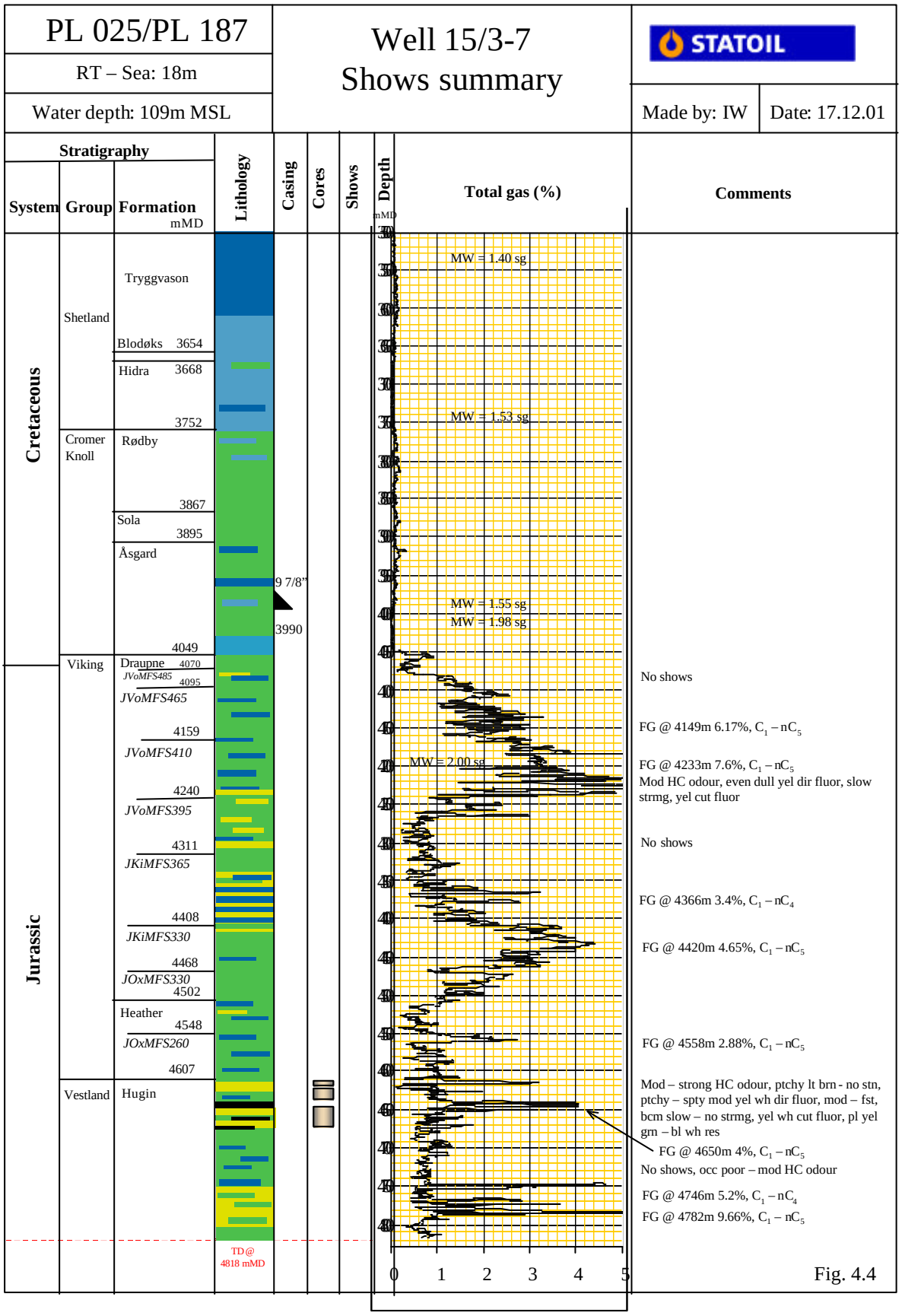

PL 025/PL 187
RT – Sea: 18m
Water depth: 109m MSL
Well 15/3-7
Shows summary
STATOIL
Made by: IW
Date: 17.12.01
Stratigraphy
System
Group
Formation
mMD
Lithology
Casing
Cores
Shows
Depth
mMD
Total gas (%)
Comments
Cretaceous
Jurassic
Shetland
Cromer Knoll
Viking
Vestland
Tryggvason
Blodøks 3654
Hidra 3668
3752
Rødby
3867
Sola
3895
Åsgard
4049
Draupne 4070
JVoMFS485 4095
JVoMFS465
4159
JVoMFS410
4240
JVoMFS395
4311
JKiMFS365
4408
JKiMFS330
4468
JOxMFS330
4502
Heather
4548
JOxMFS260
4607
Hugin
9 7/8"
3990
TD @
4818 mMD
MW = 1.40 sg
MW = 1.53 sg
MW = 1.55 sg
MW = 1.98 sg
MW = 2.00 sg
0
1
2
3
4
5
No shows
FG @ 4149m 6.17%, C1 – nC5
FG @ 4233m 7.6%, C1 – nC5
Mod HC odour, even dull yel dir fluor, slow strmg, yel cut fluor
No shows
FG @ 4366m 3.4%, C1 – nC4
FG @ 4420m 4.65%, C1 – nC5
FG @ 4558m 2.88%, C1 – nC5
Mod – strong HC odour, ptchy lt brn - no stn, ptchy – spty mod yel wh dir fluor, mod – fst, bcm slow – no strmg, yel wh cut fluor, pl yel grn – bl wh res
FG @ 4650m 4%, C1 – nC5
No shows, occ poor – mod HC odour
FG @ 4746m 5.2%, C1 – nC4
FG @ 4782m 9.66%, C1 – nC5

Fig. 4.4

4.5 Geophysical results

The Gudrun Structure is relatively well defined both as an Upper Jurassic anticline and as a Middle Jurassic horst. The Jurassic sequences have fairly good reflectivity and seismic expression. Figure 4.5 shows the seismic line 1064 at the well position, displaying the pre-well interpretation of the seismic horizon and the actual Jurassic tops. These Jurassic tops represent the prognosed zonation before a new biostratigraphic study redefined the different MFS (Maximum-Flooding-Surfaces). Also displayed in Figure 4.6, is the well tie using a 23Hz zero phase wavelet extracted from the surface seismic data (survey MC3DQ15).

All interpreted horizons came in as originally picked and well within the uncertainty window. The top Draupne Formation ties in at the center of a red trough as originally interpreted, representing a decrease in acoustic impedance.

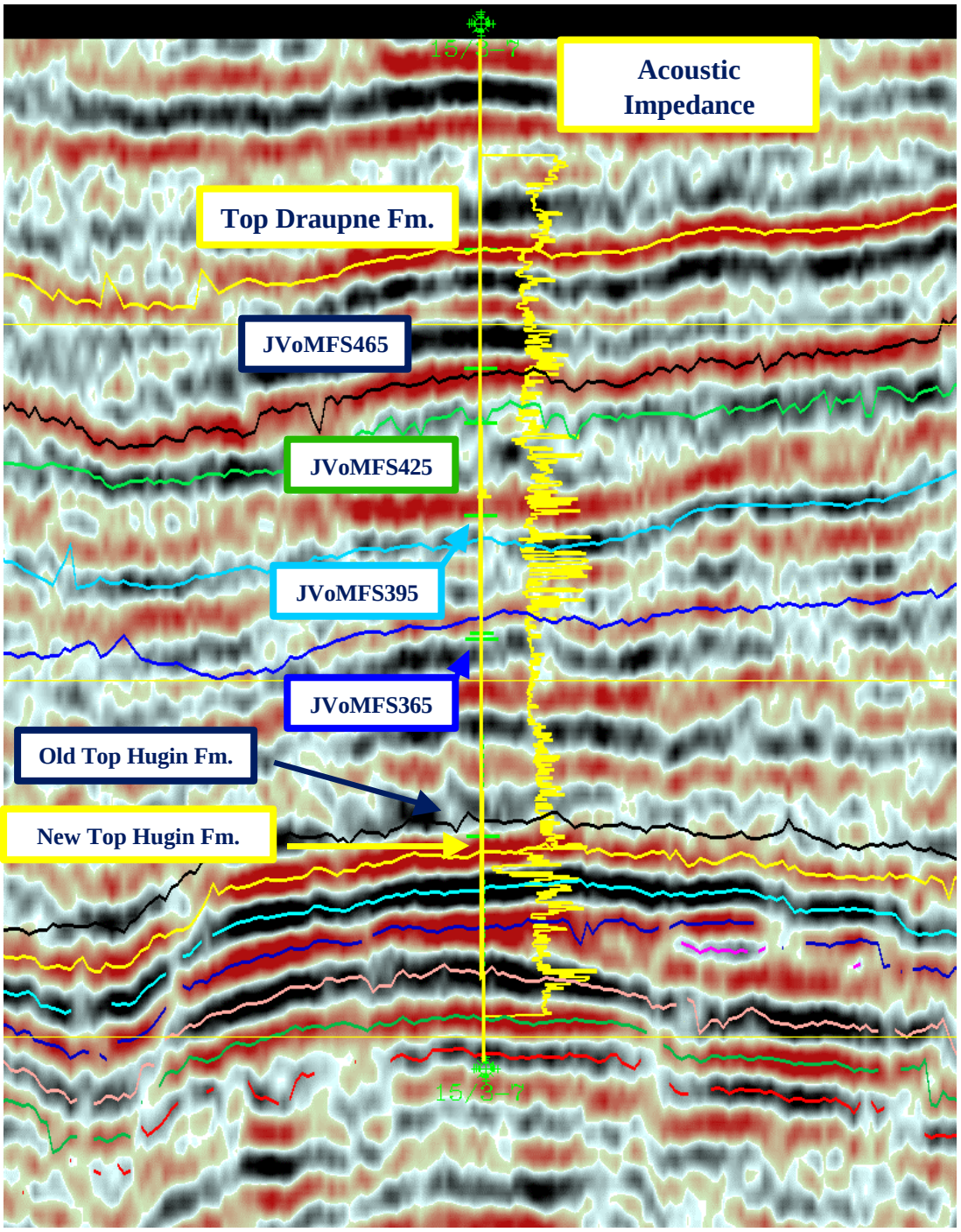
However, at the top Hugin Formation, depth was observed 38 meter (12 ms) deeper than prognosed. The top Hugin Formation was originally picked on a maximum peak representing an increase in acoustic impedance. The reason for that is mainly connected to poorer data quality control in the area prior to the 15/3-7 well. The new geophysical 15/3-7 well data defines the top Hugin Formation at a decrease in acoustic impedance and ties best with the strong reflector represented as a deeper trough (Fig. 4.6). The old and the new Top Hugin interpretation are shown in Figure 4.5.

PL 025/PL 187

Well 15/3-7, Gudrun

Geophysical results

Well tie, Seismic line 1064 (seismic survey MC3DQ15)



PL 025/PL 187
Well 15/3-7, Gudrun

Geophysical results, Well tie
23Hz zero phase wavelet (extracted)

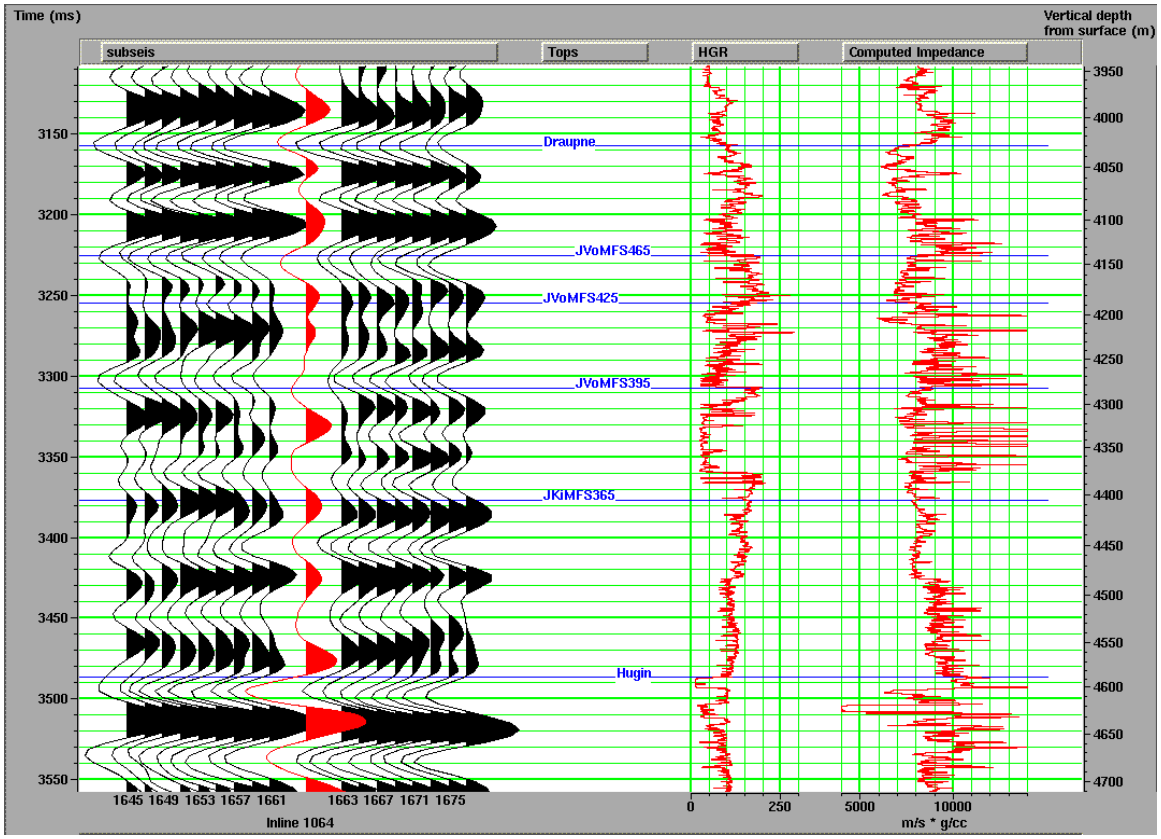


Fig. 4.6

4.6 Shallow gas

No indications of shallow gas were detected either from MWD or from Halliburton ROV while drilling the 26" hole.

4.6.1 NPD standard form for reporting shallow gas

1. Avstand fra boredekk til havnivå: 18m

2. Vanndyp: 109m

3a. Settedyp for lederør: 188mMD RT

3b. Evt. formasjonstyrketest (g/cc): -----

4a. Settedyp for foringsrør hvorpå BOP settes: 940 mMD RT

4b. Formasjonstyrketest (g/cc): 1.87 sg

5. Dyp (m RT og TVG) til formasjons-/ledd-/lagtopper: Topp Utsiraformasjonen på 654.5 mMD RT. Topp Hordalandgruppen på 868 mMD RT.

6. Dybdeintervall (mRT og TVG og alder for sandlag grunnere enn 1000 m under havbunnen. Oppgi hvilke lag som evt. inneholder gass. (eks. Kvartær 175-177 mRT, Pliocene 341-343 mRT)
   Kvartær sandlag 230 - 235 mMD RT, vannvåt.
   Kvartær sandlag 237 - 239 mMD RT, vannvåt
   Kvartær sandlag 272 - 279 mMD RT, vannvåt
   Utsiraformasjonen 668.5 - 868 mMD RT, vannvåt

7. På hvilken måte er gassen påvist? Grunn gass er ikke påvist i brønnen.

8. Sammensetning og opprindelse til gassen: -----

9. Beskriv alle målinger i gassførende lag: -----

10. Angi dyp (mRT og TVG) til inkonformiteter i borehullsposisjonen.
Bunn Kvartær var prognosert til 441mMD RT, og er observert på 433mMD RT på MWD loggen

11. Angi utbredelsen av sandlagene (kommunikasjon, kontinuitet, trunkering, etc.):
-----

12. Angi utbredelsen av evt. gass- skygging ("gas blanking"): -----

13. Angi evt seismiske indikasjoner på at gassen stammer fra dypere nivå.
Beskrivelse dersom gassen stammer fra dypere nivå: -----

14. Hvordan samsvarer tolkingen av borestedsundersøkelsen med borehulldata m.h.t.:

- *grunn gass*: Stemmer godt. Det var ikke prognosert grunn gass og grunn gass var heller ikke observert.
- *sandlag*: Sandlagene i kvartær stemmer godt med prognosen. Topp av sanden i Utsiraformasjonen ligger innenfor usikkerheten på prognosen (som var +/- 10 m), men bunn Utsiraformasjonen var prognosert på 902 mMD RT og er observert på 868 mMD RT.
- *inkonformiteter*: Bunn Kvartær er prognosert på 441mMD RT. Bunn kvartær er plukket på 433mMD RT på MWD loggen.
- *korrelasjon til nærliggende borehull*: God korrelasjon til nærmeste referansebrønn 15/3-1S som ligger 1.85 km mot vest. Kvaliteten på loggene i korrelasjons-brønnen og i brønn 15/3-7 kunne vært bedre.

4.7 Formation pressure

The pore pressure gradient, mud weight and overburden gradient and relevant drilling- and log data are presented graphically in the Figures 4.7, 4.8a and 4.8b, in sg equivalent mud weight.

The pore pressure evaluation is mainly based on electric log data (sonic and resistivity), but drilling parameters (ROP, gas) have also been used. The resistivity and sonic log data from well 15/3-7 compared well with the data from the reference wells 15/3-1S and 15/3-3. Similar trend lines and pore pressure gradients could be identified with only minor shifts.

Seabed to Base Tertiary
A normal pore pressure gradient of 1.03 sg is interpreted in the Quaternary and Tertiary down to approximately 1200 m. Formation pressure measurements performed in offset wells indicate that all sandstone bearing intervals in the Tertiary, including the Utsira, Skade, Grid, Lista and Ty Formation sandstones, are normally pressured. Sonic log trends from reference wells indicate, however, slight overpressure in the Hordaland Group, in shale-dominated intervals between the Utsira and Skade Formation sandstones and in the shale dominated intervals below the Grid Formation. However the decrease in sonic velocity in Tertiary shales, may be a lithology effect and not necessarily related to overpressure.

Cretaceous
Low permeability limestones and marls dominate the Upper Cretaceous, and it is not possible to quantify the pore pressure in these formations by evaluation of compaction trends. However the drilling parameters indicate low pore pressure in the Upper Cretaceous. The pore pressure gradient is therefore interpreted to be close to normal throughout the entire Upper Cretaceous.
An abnormal pore pressure is interpreted in the Cromer Knoll Group. A rapid increase in the pore pressure gradient from a normal gradient of 1.03 sg in the upper parts of the Rødby Formation to approximately 1.55 sg at 4000 m is interpreted. The prognosed sandstone layer (MFS465) was not present in the Draupne Formation below the BCU, but the pore pressure gradient is interpreted to increase very rapidly in the lowermost parts of the Cromer Knoll Group to approximately 1.96 sg at the top of the Draupne Formation sandstone at 4049 m.

Jurassic to TD
The formation pressure gradient was measured to 1.91 sg at 4214.8 m in the Draupne Formation oil zone, 1.89 sg at 4358.5 m in the Draupne Formation water zone, and 1.75 sg at 4611 m in the Hugin Formation. An increase in the measured gas levels at approximately 4100 m is interpreted as a near balance situation, confirming the pore pressure gradient close to 1.96 sg at the Top Draupne Formation. The pressure

gradient is slightly lower in the Hugin Formation than in the Draupne Formation and towards the depth the gradient is decreasing and reaches 1.69 sg at TD.

4.7.1 Reservoir pressure summary

Two wireline MDT runs were conducted for pressure test survey and sampling. The primary objectives were to get good pressure data in the reservoir sands and valid samples from the hydrocarbon zones in the Hugin and the Draupne Formation. A secondary objective was to collect representative water samples from water-filled zones associated with hydrocarbon-bearing zones in the Hugin and the Draupne Formation.

The first MDT run was planned as a pressure survey solely, but gave only a few good pressure points in the Hugin Formation. It was difficult to get good pressure points even where core measurements showed permeable zones in the Hugin Formation. The second MDT run was originally planned as a sampling run, but was completed as a combination of pressure measurement and sampling due to low recovery in the first run. It was not possible to enter below 4773 m in the Hugin Formation due to sticky hole.

One hydrocarbon sample was successfully taken in the Draupne Formation at 4224 m, and one water sample was recovered from the Hugin Formation at 4610 m. The tool became stuck with the cable in the Draupne sands at 4424 m and cut and thread fishing had to be performed.

The reason for the poor performance of the pressure measurements from the MDT tool is a matter of investigation. A possible cause could be fine particles entering the sidewall thereby blocking the formation.

Gradients:
It was not possible to establish any fluid gradient from the pressure measurements in the Hugin Formation.

The pressure readings in the Draupne Formation plot on a gradient that corresponds to a density of **0.559 g/cm³** in the oil zone and **1.037 g/cm³** in the water zone. Measured water density at 15 °C was 1.054 g/cm³. The water salinity was estimated to 75700 mg/l equivalent NaCl concentration, reflecting a water density of **1.037 g/cm³** at 805 bar and 140 °C, which agrees well with the measured pressure gradient from the MDT. (Ref. Baker Atlas Chart "Variation of Brine Density with Temperature and Pressure").

See table 4.7.1 for pressure measurements and Table 4.7.2 for sampling overview. Figure 4.9 shows plot of the Draupne and Hugin Formation pressure measurements and tentative gradients.

For details of analysis results, see the following reports:

- Core Lab: Reservoir Fluid Study
- West Lab: Fluid Analysis of Condensate
- Statoil: Characterization of Water samples, Hugin Fm
- Petrotech: Validity checks and Analysis of MDT samples, oil and water
- Oilphase: Field Operation Report

PL025/PL187

RT – Sea: 18m

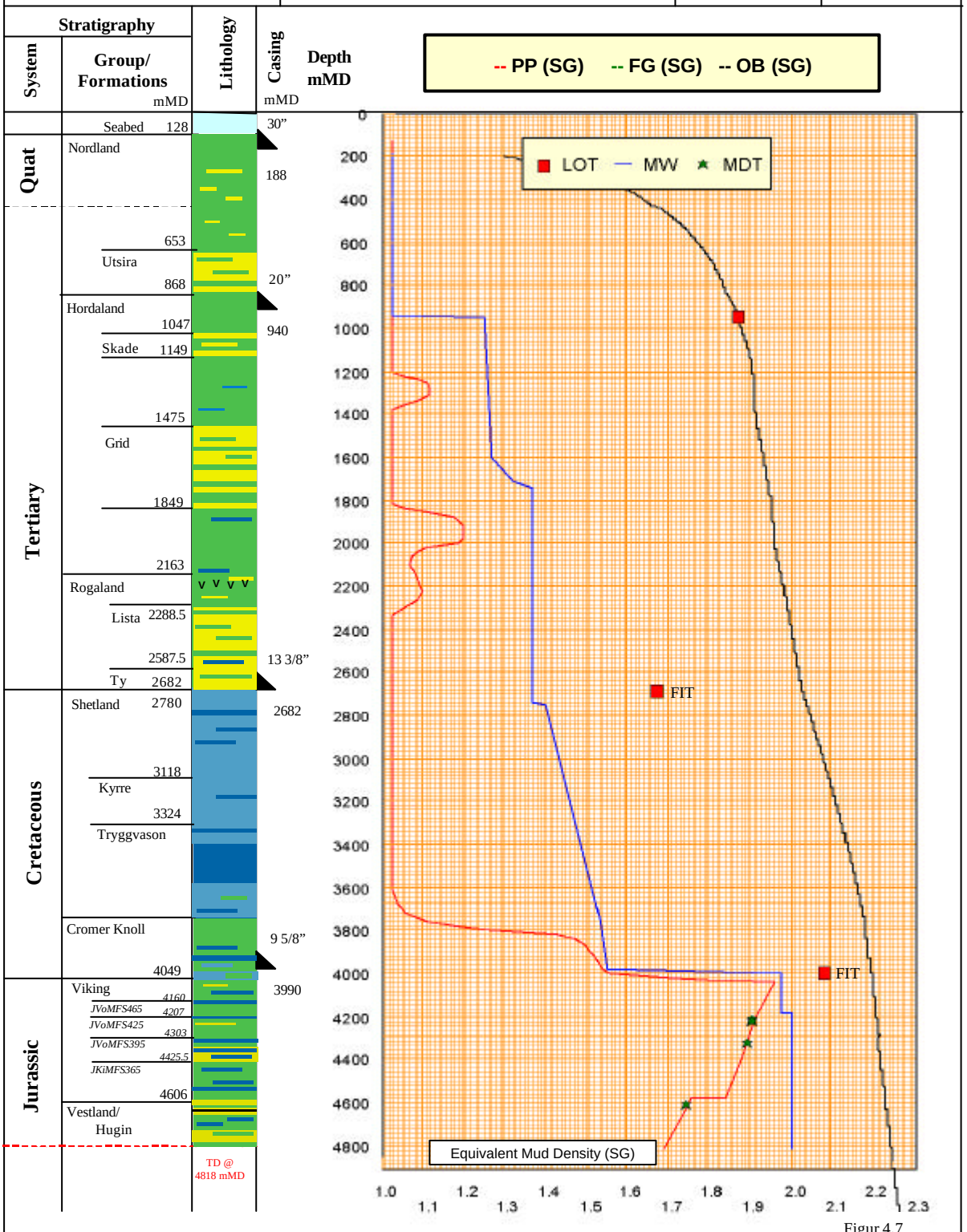
Water depth: 109m MSL

Well 15/3-7
Pressure Plot

STATOIL

Made by: JEH

Date: 28.02.02



Figur 4.7

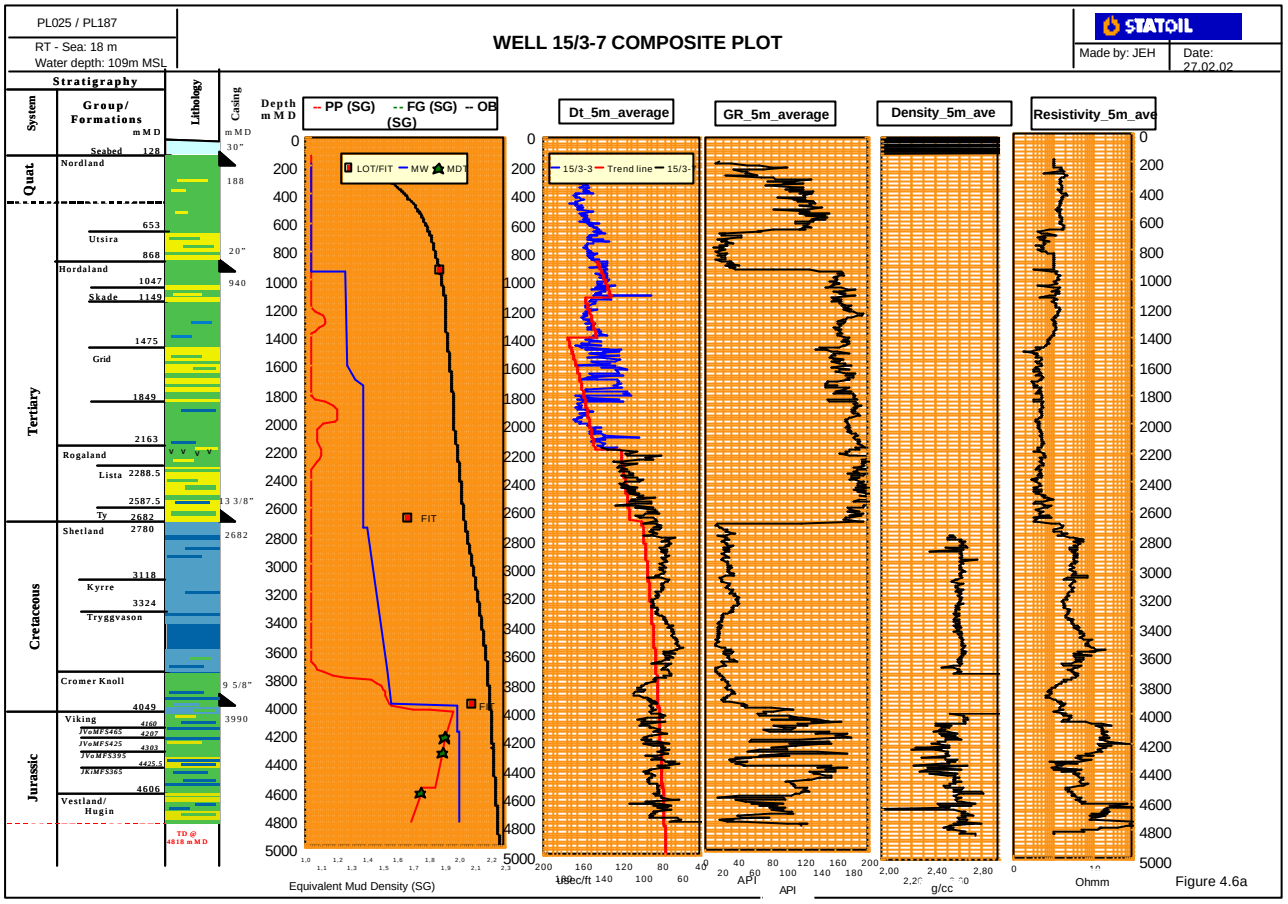
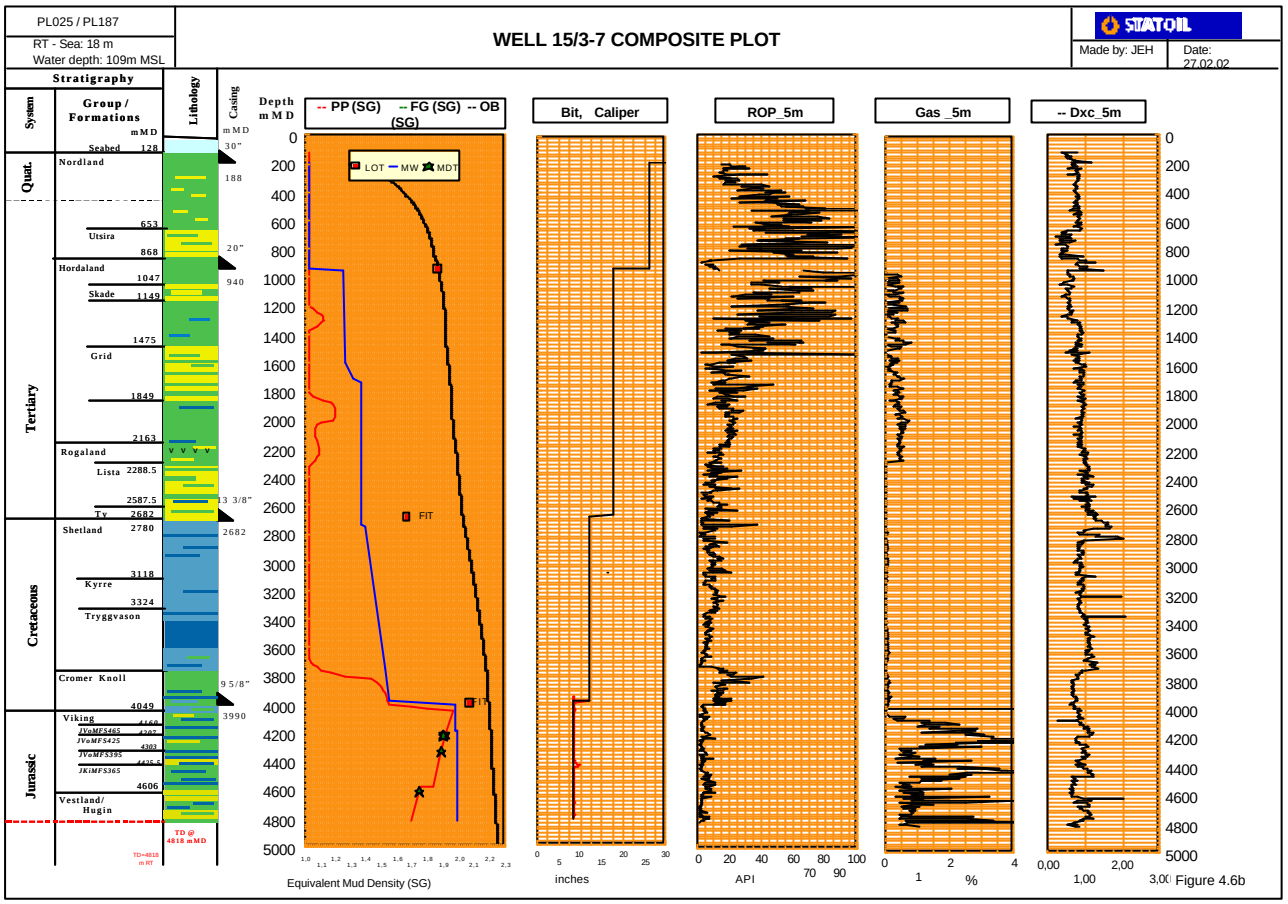

PL025 / PL187
RT - Sea: 18 m
Water depth: 109m MSL
WELL 15/3-7 COMPOSITE PLOT
STATOIL
Made by: JEH
Date: 27.02.02
Stratigraphy
System
Group/ Formations
mMD
Lithology
Casing
Depth mMD
PP (SG)
FG (SG)
OB (SG)
LOT/FIT
MW
MDT
FIT
Dt_5m_average
15/3-3
Trend line
15/3-
GR_5m_average
Density_5m_ave
Resistivity_5m_ave
Quat.
Tertiary
Cretaceous
Jurassic
Seabed 128
Nordland
653
Utsira
868
Hordaland
1047
Skade 1149
1475
Grid
1849
2163
Rogaland
Lista 2288.5
2587.5
Ty 2682
Shetland 2780
3118
Kyrre
3324
Tryggvason
Cromer Knoll
4049
Viking 4160
4606
Vestland/ Hugin
TD @ 4818 m MD
30"
188
20"
940
13 3/8"
2682
9 5/8"
3990
Equivalent Mud Density (SG)
µsec/ft
API
API
g/cc
Ohmm

Figure 4.6a


PL025 / PL187
RT - Sea: 18 m
Water depth: 109m MSL
WELL 15/3-7 COMPOSITE PLOT
STATOIL
Made by: JEH
Date: 27.02.02
Stratigraphy
System
Group / Formations
Lithology
Casing
Depth m M D
-- PP (SG) -- FG (SG) -- OB (SG)
Bit, Caliper
ROP_5m
Gas _5m
-- Dxc_5m
Quat.
Tertiary
Cretaceous
Jurassic
Nordland
Utsira
Hordaland
Skade
Grid
Rogaland
Lista
Tv
Shetland
Kyrre
Tryggvason
Cromer Knoll
Viking
Vestland/ Hugin
Seabed 128
653
868
1047
1149
1475
1849
2163
2288.5
2587.5
2682
2780
3118
3324
4049
3990
4606
30"
20"
13 3/8"
9 5/8"
188
940
2682
TD @ 4818 mMD
LOT
MW
MDT
FIT
Equivalent Mud Density (SG)
inches
API
%
Figure 4.6b

WELL 15/3-7
FORMATION PRESSURES

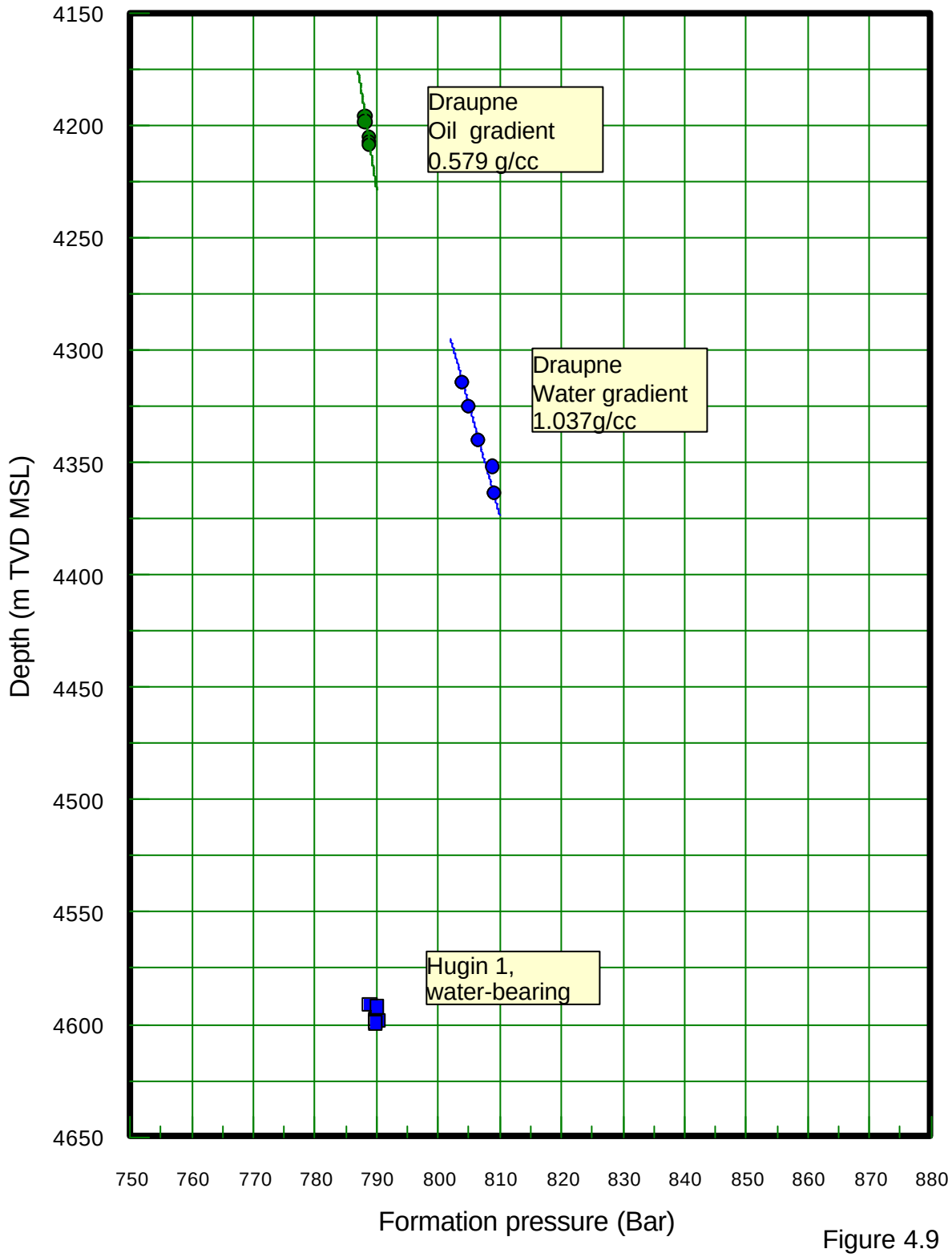


Figure 4.9

Table 4.7.1 MDT pressure measurements

FORMATION PRESSURE MDT				**Run 2A**			**DATE: 12.08.01-13.08.01**						
WELL: 15/3-7 Run 2A													
Test no.	**Zone name**	**Depth m MD**	**Depth m TVD**	**Formation Pressure (Bar)**	**Formation Pressure ref. RT) (g/cc)**	**Last-read Build-up (bar)**	**Hydro-static Pressure before (bar)**	**Hydro-static Pressure after (bar)**	**Gauge**	**Temp. (^{0}C)**	**Drawdown mob. (md/cp)**	**Pretest volume (cc)**	**Remarks**
1	Hugin	4610.0	4609.4			790.07	902.50	902.99	2	133.7	27.2	20	Not stabilized
2	Hugin	4612.0	4611.4			775.34	902.77	902.64	2	134.6	0.3	20	Tight
3	Hugin	4614.0	4613.4			790.78	902.99	902.99	2	135.2	0.6	5.6	Tight
4	Hugin	4616.5	4615.9	789.89	1.744		903.48	903.37	2	135.4	0.6	20	Good
5	Hugin	4609.7	4609.1	788.97	1.745		902.15	902.01	2	137.4	3.7	10	Good
6	Hugin	4611.7	4611.1			790.18	902.44	902.33	2	137.8	4.9	10	Supercharged
7	Hugin	4612.7	4612.1			789.96	902.52	902.42	2	138.2	1.3	10	Supercharged
8	Hugin	4614.3	4613.7			789.04	902.74	902.66	2	138.7	0.1	8	Tight
9	Hugin	4617.5	4616.9	790.01	1.744		903.37	903.25	2	139.0	0.3	10	Poor
10	Hugin	4618.3	4617.7	789.97	1.744		903.17	903.09	2	139.5	0.3	10	Poor
11	Hugin	4618.5	4617.9			790.19	903.73	903.46	2	138.8	0.1	10	Supercharged
12	Hugin	4647.5	4646.8			790.12	909.89	909.70	2		0.3	7.5	Supercharged
13	Hugin	4648.5	4647.8			782.00	909.68	909.64	2		0.1	2.6	Tight
14	Hugin	4661.0	4660.3			672.04	912.52	912.39	1	141.5		2.4	Tight
15	Hugin	4661.0	4660.3			668.89	912.47	912.44	2	141.4		20	Tight
16	Hugin	4744.0	4743.3			702.19	929.51	929.20	1	143.4		5.6	Tight
17	Hugin	4745.7	4745.0			706.45	929.53	929.37	1	144.8		3.6	Tight

FORMATION PRESSURE MDT				**Run 2A**			**DATE: 12.08.01-13.08.01**						
WELL: 15/3-7 Run 2A													
Test no.	**Zone name**	**Depth m MD**	**Depth m TVD**	**Formation Pressure (Bar)**	**Formation Pressure ref. RT) (g/cc)**	**Last-read Build-up (bar)**	**Hydro-static Pressure before (bar)**	**Hydro-static Pressure after (bar)**	**Gauge**	**Temp. (^{0}C)**	**Drawdown mob. (md/cp)**	**Pretest volume (cc)**	**Remarks**
18	Hugin	4755.1	4754.4			673.69	931.41	931.50	1	145.5		3.5	Tight
19	Hugin	4767.1	4766.4			667.68	933.88	933.76	1	146.2		3.5	Tight
20	Hugin	4770.7	4770.0			764.77	934.44	934.29	1	147.0		5.2	Tight
21	Hugin	4773.0	4772.3			707.41	934.86	934.75	1	148.1		5.4	Tight

Table 4.7.1 MDT pressure measurements (continuation)

FORMATION PRESSURE MDT				**Run 2B**			**DATE: 13.08.01-17.08.01**						
WELL: 15/3-7													
Test no.	**Zone name**	**Depth m MD**	**Depth m TVD**	**Formation Pressure (Bar)**	**Formation Pressure ref. RT (g/cc)**	**Last-read Build-up (bar)**	**Hydrostatic Pressure before (bar)**	**Hydrostatic Pressure after (bar)**	**Gauge**	**Temp. (^{o}C)**	**Drawdown mob. (md/cp)**	**Pretest volume (cc)**	**Remarks**
1	Draupne	4073.8	4073.5			532.00	797.85	797.63	1	122.0		2	Tight
2	Draupne	4075.0	4074.7			617.00	798.01	797.54	1	122.3		2.3	Tight
3	Draupne	4147.0	4146.7			586.00	813.75	813.56	1	123.3		2.5	Tight
4	Draupne	4214.8	4214.5	788.24	1.91	788.24	827.23	826.45	1	125.0	0.3	3.9	Poor
5	Draupne	4217.1	4216.8	788.22	1.91	788.22	826.93	826.80	1	126.4	364	20	Good
6	Draupne	4224.0	4223.7	788.75	1.90	788.75	828.26	828.03	1	127.1	0.6	20	Poor
7	Draupne	4226.2	4225.9	788.75	1.90	788.75	828.50	828.42	1	127.4	35.3	20	Poor
8	Draupne	4227.3	4227.0	788.82	1.90	788.82	828.65	828.55	1	127.7	7.4	20	Poor
9	Draupne	4238.0	4237.7			585.52	830.89	830.80	1	127.5		3.6	Tight
10	Draupne	4261.0	4260.7			583.46	835.74	835.64	1	128.8		3.6	Tight
11	Draupne	4271.5	4271.2			675.80	837.85	837.74	1	128.7		1.3	Tight
12	Draupne	4284.8	4284.5			656.70	840.45	840.36	1	129.2		0.8	Tight
13	Draupne	4289.0	4288.7				841.21	841.09	1	130.0		0.3	Tight
14	Draupne	4295.3	4295.0			795.94	842.39	841.96	1	130.3	2.4	20	Tight
15	Draupne	4329.4	4329.0			804.72	849.28	848.89	1	130.9	0.6	8.9	Tight
16	Draupne	4333.0	4332.6	804.01	1.89	804.01	849.64	849.49	1	131.4	12.6	20	Poor
17	Draupne	4336.5	4336.1			571.85	850.24	850.13	1	131.7	0.9	4.6	Tight

FORMATION PRESSURE MDT				**Run 2B**			**DATE: 13.08.01-17.08.01**						
WELL: 15/3-7													
Test no.	**Zone name**	**Depth m MD**	**Depth m TVD**	**Formation Pressure (Bar)**	**Formation Pressure ref. RT (g/cc)**	**Last-read Build-up (bar)**	**Hydrostatic Pressure before (bar)**	**Hydrostatic Pressure after (bar)**	**Gauge**	**Temp. (^{o}C)**	**Drawdown mob. (md/cp)**	**Pretest volume (cc)**	**Remarks**
18	Draupne	4340.1	4339.7			805.07	850.87	850.51	1	132.2	2.2	20	Tight
19	Draupne	4343.5	4343.1	805.10	1.89	805.10	851.29	851.17	1	132.3	3.1	20	Poor
20	Draupne	4353.9	4353.5			719.85	853.47	853.35	1	132.4		1.1	Tight
21	Draupne	4358.5	4358.1	806.55	1.89	806.55	854.37	854.26	1	132.5	47.3	20	Poor
22	Draupne	4370.5	4370.1	808.86	1.89	808.86	856.84	856.56	1	132.8	8.1	20	Poor
23	Draupne	4382.5	4382.1	809.06	1.88	808.06	859.19	859.07	1	133.1	13.9	20	Poor
24	Draupne	4403.9	4403.5			658.17	863.65	863.57	1	133.3		2	Tight
25	Draupne	4408.0	4407.6			676.00	864.28	864.14	1	0.0		20	Tight
26	Hugin	4609.8	4609.2			796.50	903.55		1	136.2		20	Lost seal
27	Hugin	4609.8	4609.2			790.45	902.86	902.66	1	138.0		20	Lost seal
28	Hugin	4611.1	4610.5	790.10	1.75	790.10	902.66	902.38	1	138.4	2.3	20	Poor
29	Hugin	4616.5	4615.9			791.98	903.83	903.75	1	141.1		20	Lost seal
30	Hugin	4617.0	4616.4	790.39	1.75	790.39	903.73	903.58	1	141.0	2	20	Poor
31	Hugin	4618.0	4617.4			790.08	903.57	903.38	1	140.6	1.3	20	Tight
32	Hugin	4648.1	4647.5				910.20	910.13	1	140.9		5	Tight
33	Hugin	4744.3	4743.6			790.70	929.20	928.76	1	147.6		10	Tight
34	Hugin	4755.1	4754.4				931.00	931.00	1	148.2		20	Lost seal
35	Hugin	4755.1	4754.4				931.00	931.00	1	148.4		3.3	Tight
36	Hugin	4755.6	4754.9				930.99	930.95	1	148.7		20	Lost seal
37	Hugin	4761.0	4760.3				932.08		1	148.9		20	Lost seal

FORMATION PRESSURE MDT				**Run 2B**			**DATE: 13.08.01-17.08.01**						
WELL: 15/3-7													
Test no.	**Zone name**	**Depth m MD**	**Depth m TVD**	**Formation Pressure (Bar)**	**Formation Pressure ref. RT (g/cc)**	**Last-read Build-up (bar)**	**Hydrostatic Pressure before (bar)**	**Hydrostatic Pressure after (bar)**	**Gauge**	**Temp. (^{o}C)**	**Drawdown mob. (md/cp)**	**Pretest volume (cc)**	**Remarks**
38	Hugin	4763.0	4762.3				932.10	932.10	1	149.3		20	Lost seal
39	Hugin	4744.0	4743.3				927.90		1			3.7	Poor
40	Draupne	4226.0	4225.7				825.69	825.97	1	134.6		20	Tight
41	Draupne	4224.0	4223.7			788.49	825.63		1		100.2	20	Tight
42	Draupne	4217.1	4216.8				824.05	824.04	1	131.9		20	Tight
43	Draupne	4216.9	4216.6				824.05		1		1.5	20	Tight
44	Draupne	4217.3	4217.0				824.12	824.15	1	130.9		20	Tight
45	Draupne	4217.1	4216.8				824.09	823.99	1	131.1		20	Tight
46	Draupne	4224.0	4223.7	788.53	1.90	788.53	825.66		1	130.9	67	20	Tight
47	Draupne	4224.0	4223.7						1			20	Good, sampling hc
48	Hugin	4609.1	4608.5				901.96	901.88	1	138.4	12	20	Tight
49	Hugin	4609.6	4609.0				901.83		1	139.1	6	20	Tight
50	Hugin	4610.1	4609.5				901.69		1	139.4		20	Lost seal
51	Hugin	4610.1	4609.5				901.66		1	139.8		20	Poor, sampling water

Table 4.7.3 Sampling overview

Depth m MD RKB	Sample Size	Chamber Code & Serial No.	Shut-in pressure bar	Opening pressure bar	Shut-in temp deg. C	Pump Vol. Litres	Avg. Pump Draw down bar	Mobility md/cp	Sampling			Transferred to bottles	Comments
									Date	Start	Stop		
4224.0m HC sample Draupne	250 cc	SPMC-002 MS1#3	789+343	Empty	130.4	140.0	1.0	67.3	14.08.01	04:20	04:22	-	
	250 cc	SPMC-155 MS1#2	789+343	827.0	130.3	143.0	1.0	67.3	14.08.01	04:33	04:34	9844-MA	
	250 cc	SPMC-154 MS1#6	789+343	826.0	130.3	147.0	1.0	67.3	14.08.01	04:45	04:45	9838-MA	
	450 cc	MPSR-790 MS2#5	789+343	250.0	130.2	151.0	1.0	67.3	14.08.01	04:55	04:57	PT-15016	
	450 cc	MPSR-1043 MS2#6	789+343	270.0	130.2	155.0	1.0	67.3	14.08.01	05:14	05:16	PT-15027	
	1 gal	MRSC-GA-203 SC1	789+343	250.0	130.1	160.0	1.0	67.3	14.08.01	05:25	05:37	TS-3128 TS-3119 X-10020 X-10038 X-10308 X-10024 X-10006	20cc drained for analysis Oil/condensate, density 0.826 g/cc STO
4610.1m water sample Hugin	450 cc	MPSR-754 MS1#1	790+343	0.0	141.5	18.0	59.0	6.0	14.08.01	10:33	10:40	-	Containing mud filtrate only, drained into 1l plastic bottle, 30 ppm H2S measured
	450 cc	MPSR-85 MS2#1	790+343	Empty	141.1	62.0	32.0	6.0	14.08.01	16:10	16:11	-	
	450 cc	MPSR-710 MS1#4	790+343	0.0	141.1	62.5	32.0	6.0	14.08.01	16:50	17:01	x-10263	20cc drained for analysis

Depth m MD RKB	Sample Size	Chamber Code & Serial No.	Shut-in pressure bar	Opening pressure bar	Shut-in temp deg. C	Pump Vol. Litres	Avg. Pump Draw down bar	Mobility md/cp	Sampling			Transferred to bottles	Comments
									Date	Start	Stop		
	450 cc	MPSR-783 MS2#4	790+343	Empty	141.4	89.5	34.0	6.0	14.08.01	20:46	20:47	-	Had to reboot and stop pumping,approx. 63 l pumped before stop
	250 cc	SPMC-147 MS2#2	790+343	923.0	141.4	93.0	34.0	6.0	14.08.2001	20:59	21:00	9831-MA	
Comments: Low shock used on all samples. Pump relief valve not functioning, on all samples.													

4.8 Formation temperature

Table 4.8.1 shows measured maximum temperatures from the wireline logs and MDT pretests and sampling in well 15/3-7. Figure 4.10 shows measured and extrapolated temperatures from wireline logs in well 15/3-7.
Extrapolation by Horner method from well 15/3-7 gives a temperature of 158.5 ^{o}C at 4778 m. Normalising of temperature readings including the MDT tool resulted in a bottom hole temperature of 159.8 ^{o}C at 4818 m, giving an average temperature gradient from seabed to TD of 3.31 ^{o}C /100 m.

Table 4.8.1 Temperatures well 15/3-7

Source	**Run No.**	**Depth m MD RT**	**Depth m TVD RT**	**Time since circ. (hrs)**	**Circ. Time (hrs)**	**Measured Temp. (^{0}C)**	**Extrapolated temperature by Horner method**
AIT-DSI-GR	2A	4778.0	4777.3	28.58	2	141.0	158.5 ^{o}C at 4778m, gives 159.8 ^{o}C at 4818 m
IPLT-GR	2A	4778.0	4777.3	39.25	2	144.0	
CMR-ECS-GR	2A	4773.0	4772.3	53.25	2	146.0	
MDT-GR	2A	4763.0	4762.3	70.5	2	148.0	
MDT-GR	2B	4763.0 4610.1	4762.3 4609.4	93.5 135.25	2	149.3 150.0	
AIT-IPLT-GR	3B	4818.0	4817.3	22	2	146.0	
VSP-GR	3B	4818.0	4817.3	44	2	150.0	

PL025/PL187

RT – Sea: 18m

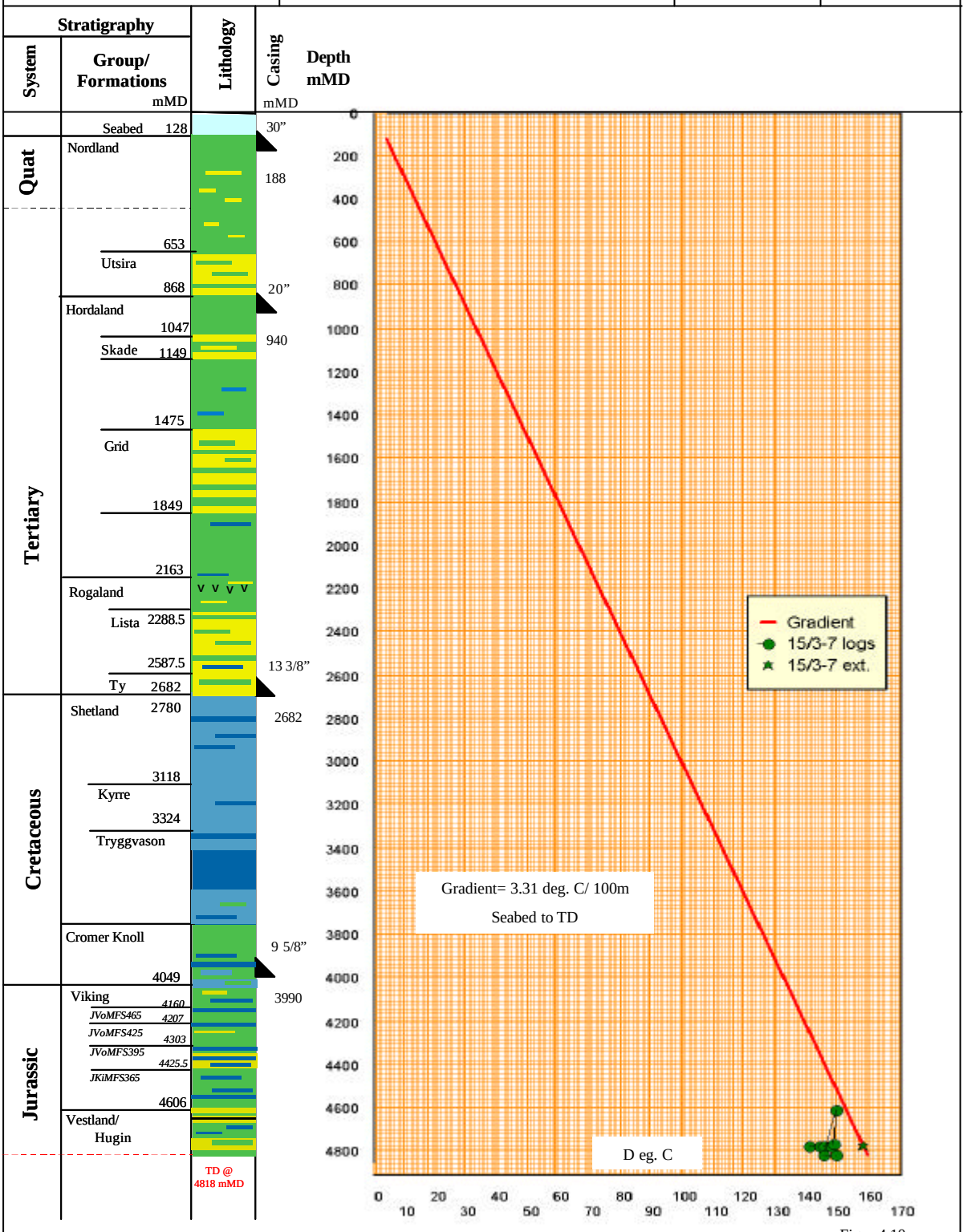
Water depth: 109m MSL

Well 15/3-7
Temperature

STATOIL

Made by: JEH

Date: 28.02.02



Figur 4.10

4.9 Experience and recommendation

4.9.1 Wireline logging experience and recommendation

Sidewall coring (MSCT) recovery and regularity were overall positive.
Successful use of intermediate VSP reduced the uncertainty on base Cretaceous from +/-80 m to +/-5m and thereby enabled a safe and optimum positioning of 13 3/8" casing.
The density log was hampered by wrong log calibration.
The MDT tool cable was stuck during water sampling in the Hugin Formation. The sticking zone was probably in the Draupne Formation at approximately 4424 m.
Tool failures on electric weak point (ECRD) and conventional sidewall core (CST) caused lost time.
Unsuccessful MDT pretests, even in permeable sands, caused reduced data coverage and extra time spent.

- **Recommendation:**
  MDT pretest performance needs to improved from formations exposed to possible invasion of fine particles when drilling with low rate of penetration in combination with high pressure overbalance
  ECRD procedures for maximum pull to be updated in the logging procedures.
  QC of logs should be stressed to avoid calibration problems.

4.9.2 Coring experience and recommendation

When laying down the core 1 and 4 the connection between the inner barrel and the core catcher was soft broke. The connection between the catcher and the shoe was backed out and the core fell into outer barrel and was stopped by the protector.

- **Recommendation:**
  Use Baker-lock on the threads. Pull out of hole when the core has jammed and not try to restart coring.

5 Drilling operations report

5.1 Rig move and anchor handling

5.1.1 Summary

The rig was towed 164 Nmiles from Snorre B to the location of 15/3-7 by Far Grip in 34,5 hours with an average sailing speed of 4,8 Nm/hr. Norsk Hydro was responsible for the moving operation, and Statoil took over the rig when the anchor handling was started at 04:30 hrs 25 April 2001.

All anchors were run in 15 hours and pre-tensioned to 180 ton without any major problems.

5.2 36” hole section

5.2.1 Summary

The 36” hole was drilled with a 17 1/2” tricone bit and a 2-stage 26”/36” hole opener. Surveys were taken every 15 meter and at TD with an Anderdrift inclination tool giving a maximum inclination of 0,25 degrees at TD. The well was circulated clean and displaced to 1,35 sg mud at TD prior to pulling out of hole. A 30” conductor was run and cemented with full returns to seabed. No hole problems were experienced while running the conductor, and the conductor was cemented with a 2 meter stick up.

5.3 26” hole section

5.3.1 Summary

Drilled 26” hole from 189 m to 945 m. A bit was lost in hole at 900 m. However, it was possible to push the bit into the formation and drill ahead to 945 m. The casing was planned set at 1200 m, but was instead set at 940 m due to the risk of the bit falling in. The 20” casing was run and cemented without any major problems, and a LOT equivalent of 1.87 sg was obtained.

5.3.2 Drilling experience and recommendations

At 840 m, a sudden pressure drop from 225 bar to 160 bar was discovered. The surface system was checked, but no leak was discovered. Hydraulic simulations indicated that opening of a plugged nozzle could have caused the pressure drop. The drilling was therefore continued.

ROP of 0-5 m/hr was experienced, and it was therefore concluded that the bit was balled. Efforts were made to heal the bit balling, and ROP up to 50 m/hr was experienced in some intervals. At 900 m the BHA was pulled, and it was then discovered that the bit was lost in hole.

- **Recommendation:**
  The combination of pressure loss and reduction in progress followed by axial vibration indicated that something was wrong in the BHA. The drilling should have been aborted and POOH. When drilling with seawater, balling is unlikely to occur since the seawater itself is dispersing. Hence, the use of un-balling pills should be unnecessary.

It was also discovered that the sleeve of the near bit stabilizer was unscrewed. This happened because the near bit stabilizer was made up upside down when it was pre-made onshore. Based on the high stick slip values experienced while drilling Utsira, it was concluded that the stabilizer sleeve unscrewed when it grabbed the formation. This has also caused sudden stops of the string and bit rotation, followed by fast accelerations. When the string stopped rotating, the 700 kg bit has probably continued rotating and unscrewed itself from the rest of the BHA.

- **Recommendation:**
  The intention of using premade assemblies is to save rig time. In this case, the quality assurance of premade assemblies was not acceptable. It is recommended to have extensive focus on the quality assurance onshore. If possible, a project member should witness the making up of the assemblies.

It was decided to run in hole with a new 26" mill tooth bit, and after 2,5 hours the lost bit was worked into the formation. 26" hole was drilled to 945 m, and the lost bit did not cause any more problems while drilling or while running 20" casing.

5.4 17 1/2" section

5.4.1 Summary

17 1/2" hole was drilled from 945 m to 2740 m. A VertiTrak mud motor was used in order to keep a vertical and straight well trajectory. At 1513 m, the VertiTrak

mudmotor twisted off. The mudmotor was fished after 4 fishing runs, causing 87,5 hours downtime in total. The drilling of the 17 1/2" hole continued down to 2740 m. 13 3/8" casing was installed and cemented. When drilling out the shoetrack, it was discovered that there were no cement in the shoetrack. A FIT was performed with no success, and two cement squeezes were then performed to cure the problem. After drilling out the cement plug and performing a FIT equivalent to 1.67 sg, it was discovered that the 13 3/8" casing had backed off at 2682 m, i.e. 4 joints above the shoe.

5.4.2 Drilling experience and recommendations

From 1286 to 1312 m the VertiTrak mud motor stalled out several times. The reason for the stalling was believed to be thin limestone stringers, and drilling continued with low ROP and no stalling problems down to 1470 m where the motor stalled again. Several incidents of pressure build up causing the pop off valves on the mud pumps to activate were experienced over the next 41 meters. At 1513 m, a gradual pressure drop of 30 bar was seen while drilling. The bit was then picked off bottom, while the circulating pressure still dropped. The assembly was pulled out of hole, and at surface the VertiTrak mud motor was found to be twisted off.

- **Recommendation:**
  The VertiTrak extreme motor in conjunction with a PDC bit is not a suitable combination. The supplier did not perform a sufficient research prior to running the VertiTrak in conjunction with a PDC bit. The track records shows that all VertiTrak applications has until now been made with rock bit and mud motor. Also, the VertiTrak act as a pendulum assembly in rotary mode, which in turn increase the bit wear. All together, this has created torque variations and a high torque level, which caused the twist-off. Hence, VertiTrak shall not be used in combination with an aggressive PDC bit in the 17 1/2" section. It should only be used in special cases where a completely vertical well is required, and it should preferably only be used in sliding mode.

- **Recommendation:**
  Do not use the combination of a PDC bit together with mud motor in the 17 1/2" section.

The motor shaft was finally fished with a tandem overshot with a modified 5 7/8" grapple in top and a standard 5 7/8" grapple in bottom.

5.4.3 Cementing experience and recommendations

A 12 1/4" BHA was run in hole to drill out the shoetrack and 3 m new formation. The float collar was found at the correct depth, but no cement was found in the

shoetrack. The shoe was also found at the correct depth, and no cement was observed in the rat hole. 3 m of new formation was drilled, and a FIT performed. Expected formation strength was 1.77 – 1.78 sg, and it was decided to perform a FIT to 1.73 sg in order to avoid problems related to fracturing of the formation. The FIT failed and there were indications of a leak to a weaker formation, possibly the Ty sandstone.

Two cement squeezes were performed. The cement plugs and 3 meter of new formation was drilled, and a FIT equivalent to 1.67 sg was performed. The FIT gave a kick tolerance of 4 m^3. When drilling out the cement, the LWD showed a window in the casing from 2682 m to 2690 m. The bottom 51 m of the casing was hence backed off and landed in the bottom of the rat hole. The new casing shoe was then at 2682 m instead of 2733 m as planned.

- **Recommendation:**
  Make sure the well is circulated clean before start of cement job. During the displacement after the cement job, a lot of cuttings came over the shakers.

- **Recommendation:**
  Perform pressure tests of casing either at plug bump or after the cement has set properly up. If poor cement is suspected behind shoe track, drill out the shoe with a tricone bit to reduce the torque. Do not use PDC bit.

5.5 12 1/4" section

5.5.1 Summary

12 1/4" hole was drilled from 2740 m to 3996 m. The section was drilled in 7 bit runs, where two of the runs were caused by the backed off 13 3/8" casing. An intermediate VSP wireline run was performed to reduce the uncertainty of the depth to the top reservoir. After identification of the Cromer Knoll Group, HPHT procedures were implemented and followed for the rest of the well. 9 5/8" x 9 7/8" casing was installed and cemented without any problems. A FIT equivalent to 2.08 sg was performed.

5.5.2 Drilling experience and recommendations

Poor progress was achieved while drilling with Hughes Christensen DP0367 PDC bit. The bit was pulled, and an aggressive Hughes Christensen MXC03 insert bit was run instead. Also this bit achieved poor progress. 27 meters were drilled using 30+ tons WOB. The bit was pulled, and all teeth in the middle row as well as 1/3 of the teeth in the outer row were observed to be lost in hole.

- **Recommendation:**
  The aggressive insert bit, Hughes Christensen MXC03, should not have been used. The bit caused junk in hole.

The rest of the section was mainly drilled with a Smith MA74PX PDC bit. Also, the Hughes Christensen DP0367 PDC bit that was rerun, but this bit achieved poor progress again. The designs of the two PDC bits are very similar, but the Smith bit had sharper cutters than the Baker bit.

- **Recommendation:**
  Smith MA74PX PDC bit drilled the Shetland Group (mostly limestone) very well, while the Hughes Christensen DP0367 PDC bit was not suited for drilling the Shetland limestone.

- **Recommendation:**
  Sharp PDC cutters are needed to cut the Shetland limestone. Wear flats or increased cutting chamfer necessitates increased weight on bit. This leads to increased frictional torque from the bit, which in turn reduce the possible string RPM (limited by DDM). Also, stalling problems was experienced due to that the high weight on bit buried the bit deeply into formation when breaking through harder stringers.

- **Recommendation:**
  The erratic torque problems experienced in the upper part of the section, totally disappeared when incorporating roller reamers in the BHA in conjunction with increasing RPM.

5.5.3 Casing experience and recommendations

The setting depth of the 9 5/8" casing was seen as the most critical issue in the well design. The section was drilled to 3996 m, which was 50 meter above the prognosed top of the reservoir.

9 5/8" x 9 7/8" casing was run and cemented without any major problems. It was decided to run 9 5/8" slick casing instead of 9 7/8" below the 13 3/8" casing shoe in order to reduce the risk of hanging up on the loose 13 3/8" casing.

- **Recommendation:**
  Use pre-packed seal assembly and preloaded cement head in order to save rig time.

- **Recommendation:**
  Problems with the casing elevator and lifting sub was experienced, due to that the OD of lifting sub was to large to go through the elevator. Poor

inspection in advance is considered to be the cause of the problem. Both ID and OD of the lifting subs for slick casing should be measured onshore. Also, the lifting subs and casing should be checked and QC'ed before sending out.

5.6 8 1/2" section

5.6.1 Summary

8 1/2" hole was drilled from 3996 m to 4818 m. The section was drilled in 21 bit runs including 4 core runs. The main reason for all the bit runs was junk in hole. Most likely approx 18 days are lost due to junk problems in this section.

It was concluded that one or more tong dies had been lost in hole. Smedvig or Weatherford, which use this kind of dies, had not reported any lost die. It was also concluded that there is no evidence to connect one of these companies to the lost die(s). A total of five fishing runs were performed in different stages of the section to get all the junk out of hole.

A total of 52 meters were cored in 4 coring runs. Two logging operations were performed, due to that TD was changed after the first decided depth.

5.6.2 Drilling mud experience and recommendation

The upper part of the section was drilled with 1.98 sg OBM. The mud weight was decided after the VSP-run in the 12 1/4" section. Based on the result from the VSP-run, a maximum expected pore pressure was established. The mud weight was decided to be maximum expected pore pressure plus 0,02 sg for safety.

At 4180m a gas peak of 34% was observed, and the mud weight was then increased to 2.00 sg. This was according to the mud weight strategy, which was to increase the mud weight according to signals from the well. The section was drilled without riser margin, but sufficient trip margin was ensured when tripping. No well control situations were experienced during the operation.

- **Recommendation:**
  When drilling into HPHT-reservoir, the mud weight should be set equal to maximum expected pore pressure plus 0,02 sg for safety. Further increase of mud weight should be based on signals from the well. When pulling out of hole, riser margin should be included in the mud weight.

5.7 Permanently plug and abandonment

5.7.1 Summary

Reference is made to chapter 5.8.2 “P&A wellbore schematic”.

The reservoir was permanently plugged and abandoned with a 4-stage cement plug from TD at 4818 m to 3778 m which is 212 m into the 9 5/8” casing. 9 7/8” casing was cut at 522 m and retrieved, and a 13 3/8” mechanical plug installed. 13 3/8” casing was then cut at 420 m and retrieved, and a 20” mechanical plug installed. A surface cement plug was set and the BOP was retrieved. Finally, the 20” x 30” casing was cut and the wellhead retrieved.

5.7.2 P&A experience and recommendations

The connection on the swivel to the premade 13 3/8” cutting assembly was not properly made up onshore, despite it was marked with 'pre-made connection' tape. Fortunately, a roughneck discovered the error when making up the assembly on drill floor.

- **Recommendation:**
  The intention of using premade assemblies is to save rig time. In this case, the quality assurance of premade assemblies was not acceptable. It is recommended to have extensive focus on the quality assurance onshore. If possible, a project member should witness the making up of the assemblies.

Weatherford B-spear enabled retrieving of seal assembly and 9 7/8” casing in one run. The operation was performed without any problems.

- **Recommendation:**
  Use Weatherford B-spear in order to retrieve the seal assembly and 9 7/8” casing in one run.

The 13 3/8” casing was cut in the same run as the 13 3/8” mechanical plug was set.

- **Recommendation:**
  In wells at shallow water depth, time can be saved when setting the 13 3/8” mechanical plug and cutting the next casing in the same run.

5.8 Figures and tables

5.8.1 Wellbore schematic

WELL SCHEMATIC

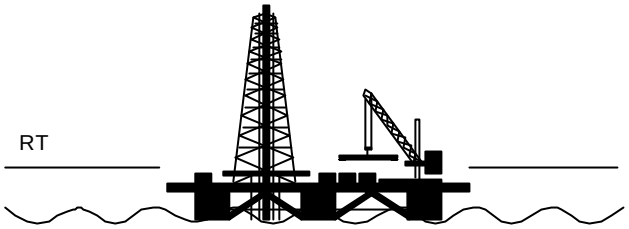
Well: 15/3-7
Field: PL025/PL187, Gudrun
Rig: West Alpha

HOLE		CASING				LOT FIT	TOC		CSG. SHOE			DYNAMIC S	LWD LOGS	SURV OH
SIZE	TVD MD	SIZE	TYPE / RAD. MARKERS	CENTRALIZERS	TEST PRESS [BAR]	PLANNED [Prognose]	TVD	MD	TVD	MD	RKB			
Seabed	127													
9 7/8"	0 0													
36"	189 189	30"	Type: 309.7 lb/ft, X-52, ST-2 Drift: 27.813"						188	188				Anderdrift
26"	945 945	20"	Interval: 127 - 136 m Type: 169 lb/ft, X-56, RL-4S Drift: 18.200" Interval: 136 - 1200 m Type: 133 lb/ft, N-80, Antares Drift: 18.543"	1 x Bow type / 3 first joints	130	1.87 (LOT)			940	940		Vibrations	GR/Res	MWD
17 1/2"	2740 2740	13 3/8"	Type: 72 lb/ft, Q-125, New Vam Drift: 12.258"	1 x Bow type / 4 first joints	410	1.67 (FIT)	2250	2250	2682	2682		Vibrations + Annular pre.	GR/Res	MWD
12 1/4"	3996 3996	9 5/8" x 9 7/8"	Interval: 124.7 - 2602 m Type: 66.4 lb/ft, C-110, Vam Ace Drift: 8.500" Interval: 2602 - 3990 m Type: 53.5 lb/ft, Q-125, Hydril SLX Drift: 8.500"		685	2.08 (FIT)	3590	3590	3990	3990		Vibrations + Annular pre.	GR/Res	MWD
8 1/2"	4818 4818								4818	4818		Vibrations + Annular pre.	GR/Res	MWD

5.8.2 P&A wellbore schematic

Well 15/3-7
West Alpha

Not to scale
All depth are MD RT

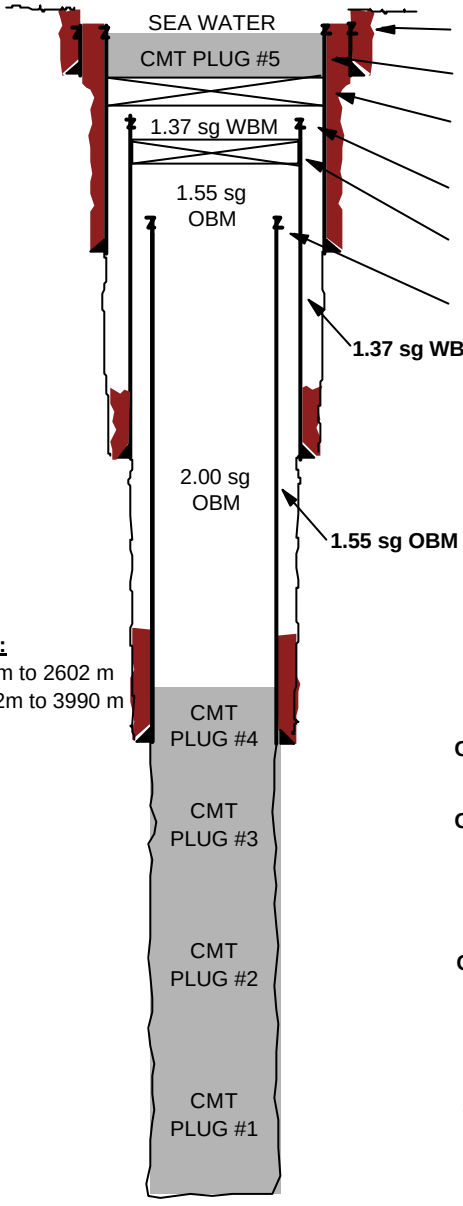


30" conductor @ 188 m :
309.7 lb/ft
X-52, ST-2
TOC: Seabed

20" casing @ 940 m :
133 lb/ft, N-80, Antares
TOC: Seabed
LOT = 1.87 SG

13 3/8" casing @ 2682 m :
72 lbs/ft, Q-125, New Vam
TOC: @ 2250 m (Sonic log)
FIT = 1.67 SG

9 5/8" x 9 7/8" casing @ 3990 m :
66.4 lb/ft, Vam Ace, C-110 : 124,7m to 2602 m
53,5 lb/ft, Hydril SLX, Q-125 : 2602m to 3990 m
Calculated TOC @ 3590 mMD
FIT = 2.08 SG



Seabed:127 m
20 and 30" casings cut @ 132 m
Cement plug #5:
Balanced surf. plug from 170 - 370 m
20" Mechanical plug #3 @ 370 m :
Pressure tested to 70 Bar above LOT
13 3/8" casing cut @ 420 m
13 3/8" Mechanical plug #2 @ 446 m :
Pressure tested to 70 Bar above LOT
9 7/8" casing cut @ 522 m
1.37 sg WBM
1.55 sg OBM

Cement plug #4: 3778 m - 4050 m

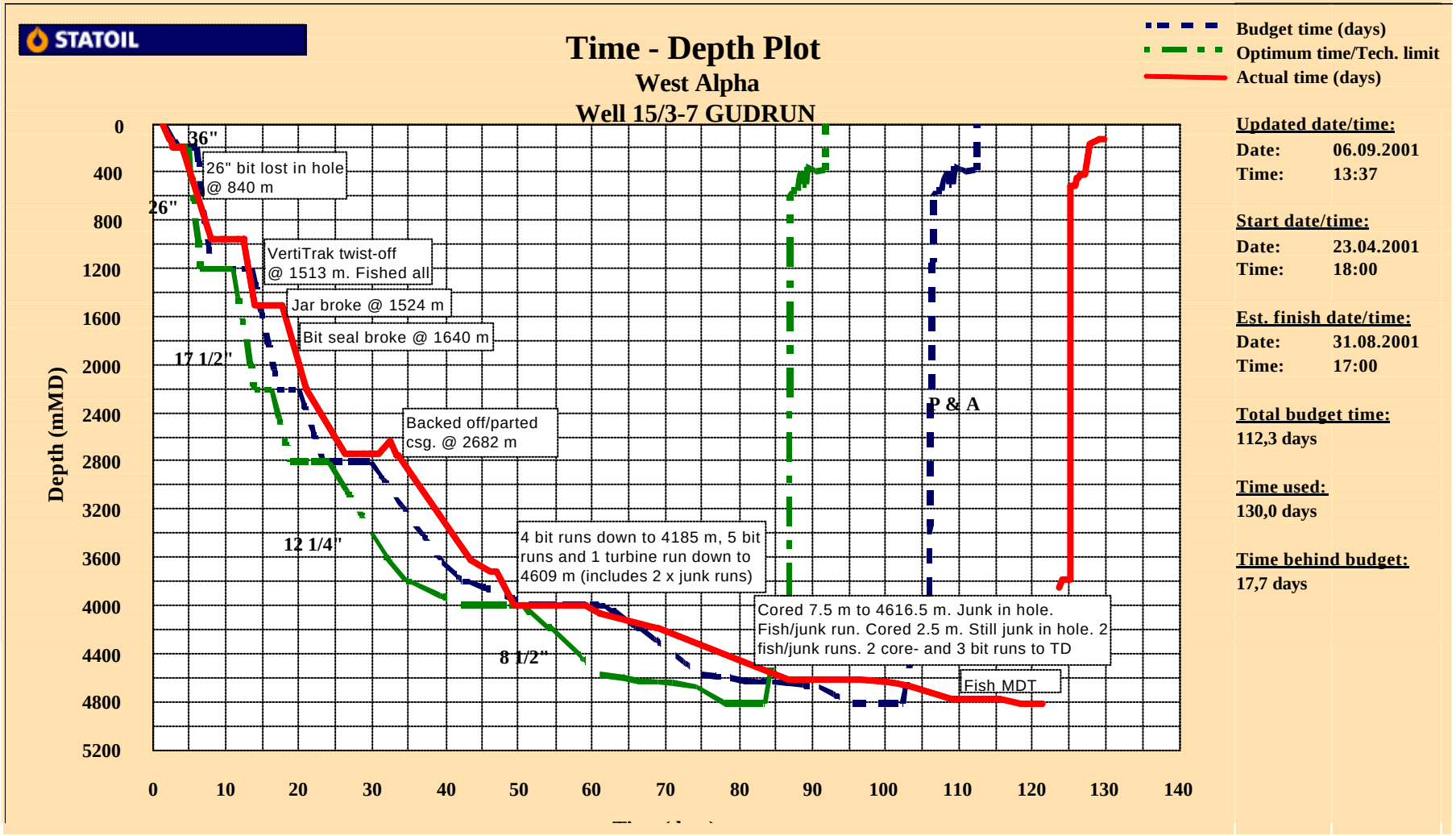
Cement plug #3: 4050 m - 4290 m

Cement plug #2: 4290 m - 4540 m

Cement plug #1: 4540 m - 4818 m

TD of well @ 4818m MD

5.8.3 Time - depth plot



5.8.4 Timeplanner

TIMEPLANNER — West Alpha — Well 15/3-7 GUDRUN

Down time/Waiting time — West Alpha — Well 15/3-7 GUDRUN

Thu	06.09.2001	13:37	Updated
Mon	23.04.2001	18:00	Start date
Fri	31.08.2001	17:00	Est. finish date

: Utvidet budsjettet

Time behind budget: 17,7 days

DAY	START DATE	START TIME	Budg. time (hrs)	Acc. budg. time (days)	Opt. time/ tech limit (hrs)	Acc. opt time (days)	Budg / Opt. depth (mMD)	Plan time (hrs)	Actual time (hrs)	Acc. actual time (days)	Actual Depth (mMD)	Stat	Activity description	Company	Down time (hrs)	Accum. down time (hrs)	Waiting time (hrs)	Accum. waiting time (hrs)	Comments (reason for down/waiting time)
													36" hole section (127 - 187 mMD)						**36" hole section (127 - 187 mMD)**
Mon	23.04.2001	18:00	40,0	1,7	33,00	1,4	8	33,0	34,5	1,4	8	F	Transit from Snorre (Hydro location) to the well location (164 nm)	Smedvig		0,0		0,0	
Wed	25.04.2001	04:30	24,5	2,7	28,00	2,2	127	20,0	23,0	2,4	128	F	Anchor handling. Rig ballasting and positioning. (MU 30" conductor and hang off)	Smedvig		0,0		0,0	
Thu	26.04.2001	03:30	5,0	2,9	4,00	2,4	127	4,0	1,0	2,4	128	F	MU 1 stand 5 1/2" HWDP, 30" running tool (CART) and cmt stand. Rack back same	Smedvig/ABB/Hall		0,0		0,0	
Thu	26.04.2001	04:30	4,0	3,1	3,00	2,5	127	3,0	3,0	2,6	128	F	MU 36" BHA. RIH	Smedvig/BHI		0,0		0,0	
Thu	26.04.2001	07:30	12,0	3,6	10,00	2,9	187	10,0	6,0	2,8	189	F	Drill 36" hole	Smedvig/BHI		0,0		0,0	
Thu	26.04.2001	13:30	5,0	3,8	4,00	3,1	187	4,0	3,0	2,9	189	F	Circ. hole clean. Displace to 1.35 sg mud. POOH	Smedvig/MI		0,0		0,0	
Thu	26.04.2001	16:30	13,5	4,3	11,00	3,5	187	11,0	7,5	3,3	188	F	MU and run 30" conductor, WH and cement stinger	Smedvig/ABB/Hall		0,0		0,0	
Fri	27.04.2001	00:00	2,5	4,4	2,00	3,6	187	2,0	2,0	3,3	188	F	Pump and displace cement	Smedvig/Hall		0,0		0,0	
Fri	27.04.2001	02:00	10,0	4,9	8,00	4,0	187	8,0	7,0	3,6	186	F	WOC	Smedvig/Hall		0,0	7,0	7,0	WOC
Fri	27.04.2001	09:00	4,5	5,0	3,50	4,1	187	3,5	3,0	3,8	186	F	Retrieve running tool and landing string. LD 36" BHA	Smed/ABB/Hall/BHI		0,0		7,0	
Fri	27.04.2001	12:00	2,5	5,1	2,00	4,2	187	2,0	1,0	3,8	186	F	PU 18 3/4" WH and install cmt plug. LD same	Smedvig/ABB/Hall		0,0		7,0	
Fri	27.04.2001	13:00	10,0	5,6	8,00	4,5	187	8,0	1,5	3,9	186	F	LD cmt stand. PU and rack back landing string	Smedvig/ABB/Hall		0,0		7,0	
Fri	27.04.2001	14:30	6,0	5,8	5,00	4,7	187	5,0	6,5	4,1	186	F	MU 26" BHA. RIH	Smedvig/BHI		0,0		7,0	
Fri	27.04.2001	21:00	4,0	6,0	3,00	4,9	187	3,0	1,0	4,2	188	F	Drill out cement and 30" shoe	Smedvig/BHI		0,0		7,0	
Section time (days)			6,0		4,85			4,9	4,2				Section time ahead of/behind (-) budg: 1,8 days. Tot. time ahead of/behind (-) budg: 1,8 days		0,0	hours	7,0	hours	Down time: 0,0% , Total Down time: 0,0% , Waiting time: 7,0% , Total Waiting time: 7,0%
													26" hole section (187 - 948 mMD)						**26" hole section (187 - 948 mMD)**
Fri	27.04.2001	22:00	40,0	8,0	39,00	6,5	1200	39,0	97,0	8,2	945	F	Drill 26" hole	Smedvig/BHI	30,5	30,5		7,0	Smedvig: Leak on drilling pup (2 h). BHI: Trip due to MWD CDR failure (5 h). Statoil: Bit lost in hole (19.5 h)
Tue	01.05.2001	23:00	4,0	8,1	3,00	6,6	1200	3,0	1,0	8,3	945	F	Circ. hole clean	Smedvig/MI		30,5		7,0	
Wed	02.05.2001	00:00	8,0	8,5	6,50	6,9	1200	6,5	6,0	8,5	945	F	Displace to 1.20 sg mud. POOH	Smedvig/MI		30,5		7,0	
Wed	02.05.2001	06:00	27,0	9,6	22,00	7,8	1200	22,0	19,0	9,3	945	F	RU and run 20" casing	Smedvig/Weath		30,5		7,0	
Thu	03.05.2001	01:00	8,5	10,0	7,00	8,1	1200	7,0	6,0	9,5	945	F	Circulate, pump and displace cement	Smedvig/Hall		30,5		7,0	
Thu	03.05.2001	07:00	4,0	10,1	3,00	8,2	1200	3,0	2,0	9,6	945	F	Release RT. Wash WH area. LD cement head and RT	Smedvig/ABB/Hall		30,5		7,0	
Thu	03.05.2001	09:00	4,0	10,3	3,00	8,3	1200	3,0	3,0	9,8	945	F	LD 26" BHA	Smedvig/BHI		30,5		7,0	
Thu	03.05.2001	12:00	5,0	10,5	4,00	8,5	1200	4,0	2,5	9,9	945	F	MU 17 1/2" BHA	Smedvig/BHI		30,5		7,0	
Thu	03.05.2001	14:30	46,5	12,4	38,00	10,1	1200	38,0	43,5	11,7	945	F	Prepare to run BOP. Run BOP/riser. Pressure test BOP	Smedvig	2,5	33,0		7,0	Smedvig: Problems with testing of conductor line (2.5 h)
Sat	05.05.2001	10:00	3,0	12,6	2,50	10,2	1200	2,5	0,0	11,7	945	F	MU 13 3/8" csg hanger and rack in derrick	Smedvig/ABB		33,0		7,0	13-3/8" Casing hanger to be pressure tested onshore
Sat	05.05.2001	10:00	5,0	12,8	4,00	10,4	1200	4,0	2,5	11,8	945	F	Pressure test IBOP, kelly cock and kelly hose	Smedvig/ABB/Hall		33,0		7,0	
Sat	05.05.2001	12:30	2,5	12,9	2,00	10,4	1200	2,0	13,0	12,3	945	F	Start RIH. Pressure test casing	Smedvig/Hall	5,0	38,0		7,0	Statoil: Leak in 20" casing (5 h)
Sun	06.05.2001	01:30	10,0	13,3	8,00	10,8	1200	8,0	2,5	12,4	948	F	Cont. RIH. Drill shoetrack and 3-5 m new form. while displ. to KCl/Pol/Glycol mud	Smed/BHI/Smed/MI		38,0		7,0	
Sun	06.05.2001	04:00	4,0	13,5	3,00	10,9	1204	3,0	2,0	12,5	948	F	Circulate. Perform LOT	Smed/MI/Hall		38,0		7,0	
Section time (days)			7,5		6,04			6,0	8,3				Section time ahead of/behind (-) budg: -0,9 days. Tot. time ahead of/behind (-) budg: 1,0 days		38,0	hours	0,0	hours	Down time: 19,0% , Total Down time: 12,7% , Waiting time: 0,0% , Total Waiting time: 2,3%

TIMEPLANNER

West Alpha

Well 15/3-7 GUDRUN

Thu 06.09.2001 13:37 Updated
Mon 23.04.2001 18:00 Start date
Fri 31.08.2001 17:00 Est. finish date
: Utvidet budsjettet

Time behind budget: 17,7 days

Down time/Waiting time

West Alpha

Well 15/3-7 GUDRUN

DAY	START DATE	START TIME	Budg. time (hrs)	Acc. budg. time (days)	Opt. time/ tech. limit (hrs)	Acc. opt. time (days)	Budg./ Opt. depth (mMD)	Plan time (hrs)	Actual time (hrs)	Acc. actual time (days)	Actual Depth (mMD)	Stat	Activity description	Company	Down time (hrs)	Accum. down time (hrs)	Waiting time (hrs)	Accum. waiting time (hrs)	Comments (reason for down/waiting time)
													17 1/2" hole section (948 - 2682 mMD)						**17 1/2" hole section (948 - 2682 mMD)**
Sun	06.05.2001	06:00	88,0	17,1	72,00	13,9	2208	72,0	35,0	14,0	1513	F	Drill 17 1/2" hole. VertiT. twist-off @1513m	Smedvig/BHI/Ana	92,5	130,5		7,0	Smedvig: Repair pop off + BX elev. (1,5 + 1,5 h). Statoil: VertiTrak twist-off @ 1513 m => fishing ops. (87,5 h). Jar broken @ 1524m (2 h)
Mon	07.05.2001	17:00	0,0	17,1	0,00	13,9	2208	87,5	87,5	17,6	1513	F	Fishing VertiTrak (motor shaft)			130,5		7,0	
Fri	11.05.2001	08:30	38,0	18,7	31,00	15,2	2208	52,5	85,5	21,2	2200	F	Drill 17 1/2" hole. VertiT. twist-off @1513m, broken jar @1524m, broken bit seal @1640m			130,5		7,0	
Mon	14.05.2001	22:00	30,5	20,0	25,00	16,2	2208	25,0	0,0	21,2	2200	F	Circ. hole clean. POOH to change bit. RIH	Smedvig/BHI/Ana		130,5		7,0	
Mon	14.05.2001	22:00	77,5	23,2	63,50	18,9	2805	120,0	127,5	26,5	2740	F	Continue to drill 17 1/2" hole. Trip to change bit. Drill to section TD	Smedvig/BHI/Ana	6,5	137,0		7,0	Smedvig: Wash out in intermediate sub on TDM (6,5 h)
Sun	20.05.2001	05:30	40,0	24,9	33,00	20,3	2805	10,0	15,5	27,1	2740	F	(Performed a short trip to 2400 m). Circ. hole clean. POOH	Smedvig/BHI/Ana		137,0		7,0	Also changed stabilizer, and picked up one std. DC Racked back one std. in derrick
Sun	20.05.2001	21:00	6,0	25,1	5,00	20,5	2805	5,0	3,5	27,3	2740	F	Wash WH. Pull seal protector	Smedvig/ABB		137,0		7,0	
Mon	21.05.2001	00:30	39,0	26,8	32,00	21,8	2805	28,0	31,5	28,6	2740	F	RU and run 13 3/8" casing	Smedvig/Weath		137,0		7,0	
Tue	22.05.2001	08:00	10,0	27,2	8,00	22,1	2805	8,0	4,0	28,8	2740	F	Circulate. Pump and displace cement	Smedvig/Hall		137,0		7,0	
Tue	22.05.2001	12:00	11,0	27,6	9,00	22,5	2805	9,0	6,0	29,0	2740	F	Set and test seal assy. Test BOP. Test csg. to 410 bar. POOH with landing string	Smedvig/ABB	0,5	137,5		7,0	Smedvig: Repair eagle light pipe handling system (0,5 h)
Tue	22.05.2001	18:00	4,0	27,8	3,00	22,6	2805	18,0	16,0	29,7	2740	F	Set wear bushing	Smedvig/ABB	12,5	150,0		7,0	ABB Vetco: Found seal assy not properly set. Pulled seal assy, set and tested new (12,5 h)
Wed	23.05.2001	10:00	4,0	28,0	3,00	22,8	2805	3,0	2,0	29,8	2740	F	LD cmt head. Test IBOP, kelly cocks and kill-/choke lines	Smedvig/Hall		150,0		7,0	
Wed	23.05.2001	12:00	16,0	28,6	13,00	23,3	2805	10,0	16,0	30,4	2740	F	MU 12 1/4" BHA while testing kill-/choke manifold. PU DP. RIH	Smedvig/BHI/Ana		150,0		7,0	
Thu	24.05.2001	04:00	12,0	29,1	10,00	23,7	2809	7,0	14,5	31,0	2740	F	Drill shoetrack and 3-5 m new formation. Circulate. Attempt to perform FIT- neg. POOH	Smedvig/BHI/Ana	11,5	161,5		7,0	Halliburton/Statoil: FIT negative. Found later the casing was backed off/parted (11,5 h)
Thu	24.05.2001	18:30	0,0	29,1	0,00	23,7	2809	34,0	34,0	32,4	2622	F	RIH CMT stinger. Perform two cement squeezes. POOH	Smedvig/Hall	54,0	215,5		7,0	Hall./Statoil: Squeeze cmt to repair primary cmt job (51,5 h). Smedvig: Bursted hydr. hose upper racking arm (0,5 h). Failure in SCR for drawwork (0,5 h) and on main breaker for 660V switch board (1,5 h)
Sat	26.05.2001	04:30	0,0	29,1	0,00	23,7	2809	12,0	20,0	33,3	2746	F	Slip-and cut drill line. RIH 12 1/4" BHA. Drill out cement and 3 m new formation	Smedvig/BHI/Ana		215,5		7,0	
Sun	27.05.2001	00:30	2,5	29,2	2,00	23,8	2809	2,0	2,5	33,4	2746	F	Performed FIT to 1,67 sg EMW (at 2682 m). POOH to 2675 m and RIH to 2746 m	Smedvig/Hall		215,5		7,0	
Section time (days)			15,8		12,90			21,0	20,9				Section time ahead of/behind (-) budg: -5,1 days. Tot. time ahead of/behind (-) budg: -4,1 days		172,5	hours	0,0	hours	Down time: 35,4% , Total Down time: 25,9% , Waiting time: 0,0% , Total Waiting time: 8,5%
													12 1/4" hole section (2682 - 3995 mMD)						**12 1/4" hole section (2682 - 3995 mMD)**
Sun	27.05.2001	03:00	10,0	29,6	8,00	24,1	2809	8,0	5,5	33,6	2746	F	Displace to OBM	Smedvig/Hall		215,5		7,0	
Sun	27.05.2001	08:30	235,5	39,5	193,00	32,2	3627	235,5	235,5	43,4	3627	F	Drill 12 1/4" hole to 3627 m. POOH. Test BOP	Smedvig/BHI/Ana	33,0	248,5		7,0	Hall./Statoil: Could not pass parted casing with whole BHA (27,5 h). Smedvig: Hydraulic & torque wrench problem DDM (5,5 h)
Wed	06.06.2001	04:00	71,5	42,4	59,00	34,6	3808	90,0	64,5	46,1	3721	F	MU 12 1/4" BHA. RIH to 3627 m. Drill to 3721 m. POOH	Smedvig/BHI/Ana	5,5	254,0		7,0	Schlumberger: MWD transmission failure (5,5 h)
Fri	08.06.2001	20:30	18,0	43,2	15,00	35,3	3808	24,0	21,0	47,0	3721	F	VSP logging run to determine top Jurassic / reservoir. WI run no. 2: DSI/LDT/GR	Smedvig/Schlum		254,0		7,0	
Sat	09.06.2001	17:30	196,6	51,4	161,00	42,0	3995	58,0	59,5	49,5	3996	F	MU HPHT kick jnt. RIH. Drill to section TD. Implemented HPHT mode @ 3750 m	Smedvig/BHI/Ana	3,0	257,0		7,0	Smedvig: Changed wash pipe. Serviced top drive drawwork brake RIH's system (2 h). Repaired mud pump no. 2 (1 h)
Tue	12.06.2001	05:00	65,0	54,1	53,00	44,2	3995	25,0	28,5	50,6	3996	F	Circulate hole clean. Short trip. Pumped out 10 stds. POOH. MU cmt std. Inst. Torque-wrench on DDM.	Smedvig/BHI/Ana	6,5	263,5		7,0	Smedvig: Leak in pop in lock jnt. (1,5 h). Installed torque wrench and bails in TDM (5 h)
Wed	13.06.2001	09:30	4,5	54,3	3,50	44,3	3995	3,5	4,0	50,8	3996	F	Retrieve wear bushing. Wash WH	Smedvig/ABB		263,5		7,0	
Wed	13.06.2001	13:30	65,0	57,0	53,00	46,5	3995	58,0	58,5	53,3	3996	F	RU and run 9 7/8" x 9 5/8" casing	Smedvig/Weath	7,0	270,5		7,0	Weath.: Lifting nippel on 9 5/8" csg not engaging elevator. Reduced the diameter in the lathe (6,5 h), of this 3 h Statoil downtime. Tong problems (0,5 h)
Sat	16.06.2001	00:00	8,5	57,3	7,00	46,8	3995	7,0	4,0	53,4	3996	F	Circulate. Pump and displace cement	Smedvig/Hall		270,5		7,0	
Sat	16.06.2001	04:00	11,0	57,8	9,00	47,2	3995	9,0	6,5	53,7	3996	F	Set and test seal assy. Press test BOP. POOH with landing string	Smedvig/ABB		270,5		7,0	
Sat	16.06.2001	10:30	1,5	57,9	1,00	47,2	3995	1,0	1,0	53,7	3996	F	LD cement head	Smedvig/Hall		270,5		7,0	
Sat	16.06.2001	11:30	4,0	58,0	3,00	47,4	3995	3,0	3,0	53,9	3996	F	Set wear bushing	Smedvig/ABB		270,5		7,0	
Sat	16.06.2001	14:30	4,0	58,2	3,00	47,5	3995	3,0	6,5	54,1	3996	F	LD 12 1/4" BHA	Smedvig/BHI/Ana		270,5		7,0	
Sat	16.06.2001	21:00	36,0	59,7	30,00	48,7	3995	40,0	43,5	55,9	3996	F	MU 9 5/8" RTTS packer. RIH on 5 1/2" DP. Set packer and test csg. POOH. LD DP	Smedvig/Hall	1,5	272,0		7,0	Smedvig: Repaired catwalk machine (0,5 h). Repaired eagle light pipe handling system (1 h)
Mon	18.06.2001	16:30	25,0	60,7	20,00	49,6	3995	51,0	51,5	58,1	3996	F	MU 8 1/2" BHA. Test shear ram to 685 bar / 10 min using plug tool. PU 5" DP. RIH	Smedvig/BHI/Ana	6,0	278,0		7,0	Smedvig: Change IBOP (4,5 h), repair catwalk machine (1,5 h)
Wed	20.06.2001	20:00	12,0	61,2	10,00	50,0	3999	10,0	26,0	59,2	3999	F	Drill shoetrack and 3-5 m new formation while increasing mud weight. Circulate	Smedvig/BHI/Ana		278,0		7,0	
Thu	21.06.2001	22:00	2,5	61,3	2,00	50,1	3999	2,0	1,0	59,2	3999	F	Perform FIT to 2,08 sg EMW	Smedvig/Hall		278,0		7,0	
Section time (days)			32,1		26,77			26,2	25,8				Section time ahead of/behind (-) budg: 6,3 days. Tot. time ahead of/behind (-) budg: 2,1 days		62,5	hours	0,0	hours	Down time: 10,1% , Total Down time: 18,6% , Waiting time: 0,0% , Total Waiting time: 8,5%

5.8.5 Bit records

Wellbore: 0015/03-007

Run No	Bit Size	Bit No	BHA No	Bit Type	IADC code	Bit manufacturer	Serial No	Nozzles (n/32") no x n	no x n	no x n	no x n	Flow Area in2
1	17 1/2"	1	1	MAXGTPT09	435	Hughes Christensen	13CTGEINO	1 x 14	3 x 20	x	x	1.071
	26"/36"	1HO	1	HO2STAGE	135	IPE		3 x 13	3 x 13	x	x	.778
2	26"	2	2	MSDSSHC	115	Smith Bits	LW9647	2 x 18	2 x 20	1 x 14	x	1.261
3	26"	2RR	3	MSDSSHC	115	Smith Bits	LW9647	2 x 18	2 x 20	1 x 14	x	1.261
4	26"	3	4	GTXCMG1	115	Hughes Christensen	D92DM	x	2 x 18	1 x 20	x	.804
5	17 1/2"	4	5	AG526	M423	Eastman Christensen		8 x 12	x	x	x	.884
6	17 1/2"	5	8	FS2663	S123	Security	5008766	9 x 12	x	x	x	.994
7	17 1/2"	6	9	MXT03DX	415	Hughes Christensen	L24D.D	2 x 18	1 x 20	1 x 14	x	.954
8	17 1/2"	7	10	O2GMODPD	415	Smith Bits	LW 3506	2 x 18	1 x 20	1 x 14	x	.954
9	17 1/2"	8	11	MXT09DX	437	Hughes Christensen	K48DJ	2 x 18	1 x 20	1 x 14	x	.954
10	12 1/4"	9	12	DP0367	M323	Hughes Christensen	1214058	7 x 13	x	x	x	.907
11	12 1/4"	9R	12	DP0367	M323	Hughes Christensen	1214058	7 x 13	x	x	x	.907
12	12 1/4"	9RR	13	DP0367	M323	Hughes Christensen	1214058	7 x 13	x	x	x	.907
13	12 1/4"	10	14	MXC03	417	Hughes Christensen	M2203A3	1 x 14	3 x 20	x	x	1.071
14	12 1/4"	11	15	MA74PX	M223	Smith Bits	SCC457	3 x 15	3 x 16	x	x	1.107
15	12 1/4"	9R3	16	DP0367	M323	Hughes Christensen	1214058	3 x 13	4 x 14	x	x	.990
16	12 1/4"	12	17	MA74PX	M223	Smith Bits	SC1121	3 x 15	3 x 16	x	x	1.107
17	8 1/2"	13	18	FM2745DR	M333	Security	34761	4 x 13	x	x	x	.519
18	8 1/2"	14	20	HC408	M432	Hughes Christensen	1214057	4 x 12	x	x	x	.442
19	8 1/2"	15	20	FM2745DR	M433	Security DBS	5007790	4 x 12	x	x	x	.442
20	8 1/2"	16	21	ATJG8	347	Hughes Christensen	B59BD	2 x 12	1 x 17	x	x	.443
21	8 1/2"	17	22	DS94DGJNW	M432	Hycalog	201067	4 x 12	x	x	x	.442
22	8 1/2"	18	23	DS148DGJNW		Hycalog	101340	3 x 10	3 x 12	3 x 7	x	.675
23	8 1/2"	19	24	MA32HQPX	M432	Smith Bits	JS2383	3 x 8	6 x 12	x	x	.810
24	8 1/2"	20	25	TI3105B	M843	Security DBS	701023	x	x	x	x	1.200
25	8 1/2"	21	26	BD447P	M433	Hughes Christensen	1214114	4 x 13	x	x	x	.519
26	8 1/2"	22	27	ATJG8	347	Hughes Christensen	C65DP	2 x 12	1 x 18	x	x	.470
27	8 1/2"	21R	28	BD447P	M433	Hughes Christensen	1214114	4 x 13	x	x	x	.519
28	8 1/2"	23	29	FC204DRLI	COREI	Security DBS	7990074	x	x	x	x	
29	7 7/8"		30	JUNKBASKET	JUNKE	Smith Bits		x	x	x	x	
30	8 1/2"	24	31	FCI204RILI	M333	Security DBS	7990070	x	x	x	x	
31	8 3/8"	25	32	JUNKMILL	ZERO	Tristate	RBN132122	x	x	x	x	
32	8 1/2"	26	34	FC284RILI	COREI	Security DBS	7990558	x	x	x	x	
33	8 1/2"	27	35	LD470HG	M649	Lyng	2652	4 x 13	x	x	x	.519
34	8 1/2"	28	36	FCI204DRILI	COREI	Security DBS	710610	x	x	x	x	
35	8 1/2"	27RR	37	LD470HG	M649	Lyng	2652	4 x 13	x	x	x	.519
36	8 1/2"	29	38	BD447P	M433	Hughes Christensen	1214145	4 x 13	x	x	x	.519
37	8 1/2"	30	40	DS94DGJNW	M432	HYCALOG	200373	4 x 13	x	x	x	.519
38	8 1/2"	22R	42	ATJG8	347	Hughes Christensen	C65DP	24 x 24	24 x	x	x	10.603

Run No	Bit Size	Pump Rate l/min	Pump Press bar	Depth in mMD	Depth out mMD	Drilled length m	Hours Drilled	ROP	Min WOB ton	Max WOB ton	Min RPM	Max RPM	Torque Min Nm	Torque Max Nm	Con drag Min 1000 daN	Con drag Max 1000 daN
1	17 1/2"	5000	120	128	189	61	6	10.2		2	100	115				
	26"/36"	5000	120	128	187	59	6	9.8		2	100	115				
2	26"		206	188	245	57	2.6	21.9		4	100	100	2	9		
3	26"	4500	160	245	897	652	22.6	28.8		11	20	182	1	23		
4	26"	4500	220	897	945	48	5.5	8.7	1	7	34	106	3	11		
5	17 1/2"	4100	270	945	1513	568	13.4	42.4		10	100	320	4	29		
6	17 1/2"	4000	230	1513	1524	11	1.1	10.0		3	20	160	14	31		
7	17 1/2"	4230	240	1524	1641	117	9.3	12.6	2	8	60	146	4	20		
8	17 1/2"	2850	160	1641	2554	913	69	13.2	7	20	10	40	3000	19000		
9	17 1/2"	2880	178	2554	2740	186	39.2	4.7	10	30	10	30	4000	14000		
10	12 1/4"	3000	295	2740	2743	3	0.5	6.0	1	5	30		1000	7000		
11	12 1/4"	3000	300	2743	2777	34	6.7	5.1	1	15		140	5000	25000		
12	12 1/4"	3200	300	2777	2792	15	4.8	3.1	6	18		25	8000	23000		
13	12 1/4"	3300	295	2792	2819	27	15	1.8	28	32	20	90	5000	10000		
14	12 1/4"	3550	300	2819	3627	808	103.5	7.8	7	14	90	105	1000	40000		
15	12 1/4"	3300	300	3627	3721	94	31.2	3.0	8	16	60	170	1000	40000		
16	12 1/4"	3300	300	3721	3996	275	19.8	13.9	1	5		160	8000	19000		
17	8 1/2"	1130	150	3996	4063	67	24.3	2.8	5	13	40	150	6000	24000		
18	8 1/2"	1142	152	4063	4076	13	9.1	1.4	2	14	50	90	3000	23000		
19	8 1/2"	1200	182	4076	4079	3	2.7	1.1	2	12	50	100	3	20		
20	8 1/2"	1200	144	4079	4080	1			2	16	10	65	3	15		
21	8 1/2"	1250	175	4080	4185	105	37.3	2.8	8	14	80	160	8	24		
22	8 1/2"	1300	172	4185	4260	75	20.4	3.7	5	15	60	110	2	22		
23	8 1/2"	1300	175	4260	4349	89	39.9	2.2	5	17	60	107	4	17		
24	8 1/2"	1100	320	4349	4465	116	45.6	2.5	1	10		900				
25	8 1/2"	1280	200	4465	4545	80	14	5.7	2	4	120	160	5000	20000		
26	8 1/2"	1100	150	4545	4546	1	0.8	1.3	1	5	120	150	5000	10000		
27	8 1/2"	1150	173	4546	4609	63	10.2	6.2	3	5	120	160	7000	12000		
28	8 1/2"	1000	123	4609	4616	7	2.6	2.7	2	15	50	130	5000	20000		
29	7 7/8"	1100	107	4616	4616	0										
30	8 1/2"	1110	170	4616	4619	3	2.2	1.4	2	20	70	140	3000	34000		
31	8 3/8"	1025	132	4619	4620	1	2.3	.4	2	7	20	80	4000	16000		
32	8 1/2"	1100	190	4620	4635	15	9.3	1.6	5	17	80	120	6000	20000		
33	8 1/2"	1020	153	4635	4643	8	1.7	4.7	1	5	60	160	5000	11000		
34	8 1/2"	1100	148	4643	4670	27	12.3	2.2	5	15	70	110	6000	20000		
35	8 1/2"	1100	170	4670	4755	85	41.9	2.0	5	18	60	160	5000	20000		
36	8 1/2"	1200	180	4755	4778	23	17.6	1.3	5	10	70	160	5000	18000		
37	8 1/2"	1370	215	4778	4818	40	12.6	3.2	1	8	60	100	6000	19000		
38	8 1/2"	1000	110		3778				1	6		60				

Run No	Bit Size	IADC dull grading I	O	DC	L	B	G	OC	RP	Remarks
1	17 1/2"									
	26"/36"									
2	26"	0	0	NO	A	E	I	NO	DTF	DRILLED FROM 191 M TO 245 M
3	26"									BIT LOST IN HOLE
4	26"	2	3	WT	A	E	I	NO	TD	CENTER NOZZLE LOST IN HOLE
5	17 1/2"	3	6	RO	N	X	I	PN	TW	BIT LOST IN HOLE AND LATER RECOVERED
6	17 1/2"	1	1			X	I	NO	PR	BIT PULLED DUE TO LOW ROP AND HIGH TORQUE.
7	17 1/2"	1	2	WT	H	F	I	ER	TQ	
8	17 1/2"	4	4	BT	M	E	1/4"	RG	PR	
9	17 1/2"	2	3	WT	A	E	1/16	BT	TD	
10	12 1/4"									ONE NOZZLE PLUGGED
11	12 1/4"	1	2	CT	S	X	I	NO	BHA	3 NOZZLE PLUGGED
12	12 1/4"	1	2	CT	S	X	I	NO	PR	
13	12 1/4"	8	6	LT	A	E	5/16"	BT	PR	ALL TEETH IN MIDDLE ROW LOST. 1/3 OF TEETH OUTER ROW LOST.
14	12 1/4"	4	7	WT	S	X	I	RO	PR	ET BLAD HAR FÅTT STOR SKADE I NESEN.
15	12 1/4"	1	3	CT	S	X	I	NO	PR	RERUN
16	12 1/4"	1	1	CT	N	X	IN	NO	TD	
17	8 1/2"	1	6	WT	S	X	I	NO	PR	
18	8 1/2"	2	8	RO	S	X	I	JD	PR	
19	8 1/2"	2	5	JD	S	X	I	WT	PR	
20	8 1/2"	2	5	JD	A	E	I	CT	BHA	BIT USED TO MILL AND CLEAN OUT JUNK.
21	8 1/2"	2	6	LT	S	X	I	HC	PR	8 CUTTERS LOST.
22	8 1/2"	2	8	RO	T	X	1	WT	PR	
23	8 1/2"	1	2	PN	C	X	I	CT	PR	
24	8 1/2"	8	8	RO	N	X	I	HC	PP	Drilled with turbine, approx 2.45 mill REVs. Parts of bit broken off.
25	8 1/2"	1	1	NO	A	X	I	NO	HP	SOME JUNKMARKS ON GAUGE PROTECTION.
26	8 1/2"	1	2	NO	A	Q	I	NO	BHA	BIT USED TO MILL / CLEAN OUT JUNK + DRILLED 1 M NEW FORMATION.
27	8 1/2"	2	3	BT	N	X	I	NO	CP	
28	8 1/2"	3	8	JD	S	X	i	RO	PR	CUT CORE FROM 4609 M TO 4616.5 M, JAMMED. COREHEAD WAS RINGED OUT DUE TO JUNK IN HOLE. FOUND ONE PIECE OF ALUMINUM ON THE BIT: 2.3 x 3.5 x 0.6 CM.
29	7 7/8"									REVERSE CIRC. JUNK BASKET WITH MAGNET INSERT.
30	8 1/2"	2	8	JD	S	X	I	CT	PR	COREHEAD NO 2.
31	8 3/8"									
32	8 1/2"	8	8	WT	A	X	I	PN	PR	COREHEAD NO. 3
33	8 1/2"	1	1	NO	A	X	I	NO	CP	
34	8 1/2"	2	2	PN	A	X	I	CT	BHA	COREHEAD NO. 4. 4 OF 10 NOZZLES PLUGGED.
35	8 1/2"	2	8	RO	S	X	I	WT	PP	
36	8 1/2"	6	8	RO	S	X	33	WT	PP	BIT 2 1/16" UNDER GAUGE.
37	8 1/2"	1	1	LT	N	X	1	BU	TD	1 LOST TOOTH. FOUND THE 4 WATERWAYS WITH BLINDED PORTS PACKED WITH CLAY.
38	8 1/2"	1	2	NO	A	E	I	NO	DP	TAGGED CEMENT PLUG AT 3774 M. DRESSED PLUG TO 3778 M.

5.8.6 Drilling fluid program

DRILLING FLUIDS PROGRAMME

Well: 15/3-7
Field: PL025/PL187, Gudrun
Rig: West Alpha

HOLE SIZE	HOLE TVD MD	CASING SIZE	CASING TVD MD	MUD TYPE	MW [g/cm³]	LGS [kg/m³]	10 sec. Gel [Pa]	10 min. Gel [Pa]	Fann 3 rpm	O / W ratio	PV [mPa]	API FL [ml]	HTHP FL [ml]	MBT [kg/m³]	pH	KCl [kg/m³]	Glycol [Vol%]	ES [Volt]	Funnel Visc. [sec]	Usage Volume [m³]
36''	188 188	30''	187 187	Spec. no. 1 SW/ Bentonite	1,03														> 100	141
				Comments: Sea water will be used in combination with Bentonite high viscous pills. CMC EHV will be on location as contingency. The well will be displaced to 1.35 sg Bentonite mud prior to running conductor. A minimum of 100 m³ of 1.70 sg kill mud will be ready in the reserve pits, prior to drilling top hole section.															
26''	945 945	20''	940 940	Spec. no. 1 SW/Bent. Kill mud	1,03 1,70														> 100 >60	1142
				Comments: Sea water will be used in combination with Bentonite high viscous pills. CMC EHV will be on location as contingency Displace to 1.20 sg Bentonite mud - by using diluted Kill mud - prior to running 20" casing.															
17 1/2''	2740 2740	13 3/8''	2735 2735	Spec. no. 18 KCl/ Polymer/ Glykol	1,25 -1,37	34 - 178	4.0-6.5	5.0-10.0	9-12		15-23	2.3-3.4		21-45	7.5 - 7.8	125-149	3.5 - 4.5			1402
				Comments: High viscous Bentonite mud from previous section - and seawater - should be used to drill cement / shoe, prior to displacement. Mud weight will gradually be increased from 1.20 sg to 1.40 sg at approx. 2000 m MD															
12 1/4''	3996 3996	9 7/8''	3990 3990	Spec. no. 48 OBM	1,40 -1,55	< 173	6.0-7.0	8.0 - 13.0	8.0-12.0	66/34 - 84/16	28-38		1.8-3.0					615-1245		426
				Comments: Used OBM will be shipped out and treated before start drilling. New volume will be used in conjunction with used mud to achieve desired properties. Mud weight will be increased in steps as drilling commence.															
8 1/2''	4818 4818	7''	- -	Spec. no. 48 OBM	1.98 - 2.03	75-152	4.0 - 9.0	7.0 - 13.0	6.0 - 10.0	84/16 - 87/13	49 - 70		1.8-2.8					922 - 1375		359
				Comments: After RT the mud weight will be increased to 2.00 sg OBM - by displacing the well - before drilling ahead to TD.															

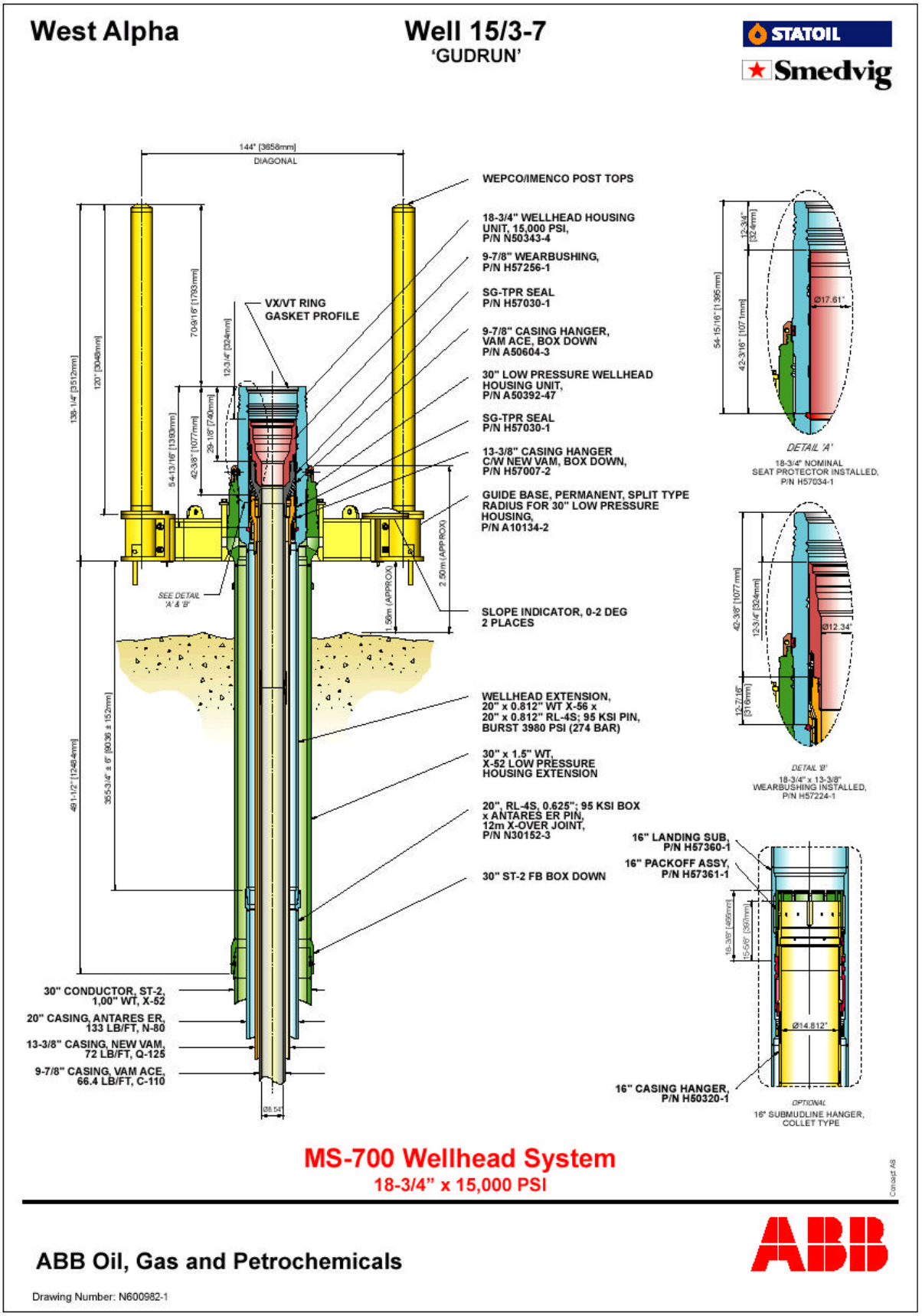
5.8.7 Cement program

CEMENT PROGRAMME

Well: 15/3-7
Field: PL025/PL187, Gudrun
Rig: West Alpha

HOLE		CASING SHOE		TOC	EXCESS VOLUME	CEMENT SLURRY DESIGN										SPACER	DISPLACEMENT
SIZE	TVD MD	SIZE	TVD MD	TVD MD		Components	L (Lead) [ltr/100kg]	T (Tail) [ltr/100kg]	Density [g/cm³]	Yield [ltr/100kg]	Stat. / Circ. Temp [°C]	Thickening time [hrs to 30 Bc]	API Free Water [%]	API Fluid loss [cc/30min]	24 hrs C. S. [psi]		Fluids and Rates
36"	188 188	30"	187 187	Sea Bed Sea Bed	200% OH	Norcem "G" Cmt. (100 kg) Econolite NF-6 CaCl2 liquid Sea water	 3.20 0.10 95.07	 0.10 4.35 39.56	L: 1.56 T: 1.95	Code STL10: L: 129.42 Code STT10: T: 75.06	5 / 9	L: > 6 T: 3-4	not controlled	n/a	L: +/- 50 T: +/- 400	2 x annulus volume Sea Water	Sea water +/- 1000 lpm
26"	945 945	20"	940 940	Sea Bed Sea Bed	50% OH	Norcem "G" Cmt. (100 kg) Econolite NF-6 HR-4L Sea water	 3.20 0.10 2.40 93.65	 0.10 45.00	L: 1.56 T: 1.92	Code STL40: 130.01 Code STTNT: 76.16	30 / 20	L: 6 T: 3-4	not controlled	n/a	L: +/- 200 T: +/- 1000	1 casing volume Sea Water	Sea water 3000 lpm
17 1/2"	2740 2740	13 3/8" + Squeeze	2735 2735	2250 2250	0% OH	Norcem "G" Cmt. (100 kg) HR-5L Halad-99E+ NF-6 Fresh water	 	 0.70 1.00 0.10 42.22	 1.92 	Code 25B: MPT05B	90 / 45	04:44	< 0.5	n/a	2000	18.2 m3 1.60 SG Spacer 3T	WBM 2500 lpm
12 1/4"	3996 3996	9 7/8"	3996 3996	3990 3990	3.4 m3	Norcem "G" Cmt. (100 kg) SSA-1 (%BWOC) Microblock CFR-3L SCR-100L Halad-600LE+ NF-6 Drill water	 	 33.24 10.00 0.50 1.50 6.00 0.10 37.39	 1.95 	Code 17B: 95.23 	129 / 80	5:54	0	54	3300	15 m3 1,75 SG Spacer 4AT	OBM 1500 lpm
8 1/2" plug	4818 4818		- -	3778 3778		Norcem "G" Cmt. (100 kg) SSA-1 (%BWOC) Micromax Microblock SCR-500L Halad-413L NF-6 Fresh water	 	 33.00 30.00 15.00 5.10 (3.50) 8.00 0.10 31.05 (32.51)	 2.10 	Code 19C: 109.11 (108.97) 	155 / 115	8:12	0	28	3000	5.0 m3 ahead 2,05 SG Spacer 4AT	OBM +/- 1000 lpm
20"	370			170		Norcem "G" Cmt. (100 kg) NF-6	 	 0.10	 1.90	Code STTNT: 102.31	12 / 12	5-7	not controlled	n/a	+/- 400	Sea water	Sea water

5.8.8 Wellhead system


West Alpha
Well 15/3-7
'GUDRUN'
STATOIL
Smedvig
144" [3658mm]
DIAGONAL
WEPCO/IMENCO POST TOPS
18-3/4" WELLHEAD HOUSING UNIT, 15,000 PSI, P/N N50343-4
9-7/8" WEARBUSHING, P/N H57256-1
SG-TPR SEAL P/N H57030-1
9-7/8" CASING HANGER, VAM ACE, BOX DOWN P/N A50604-3
30" LOW PRESSURE WELLHEAD HOUSING UNIT, P/N A50392-47
SG-TPR SEAL P/N H57030-1
13-3/8" CASING HANGER C/W NEW VAM, BOX DOWN, P/N H57007-2
GUIDE BASE, PERMANENT, SPLIT TYPE RADIUS FOR 30" LOW PRESSURE HOUSING, P/N A10134-2
SLOPE INDICATOR, 0-2 DEG 2 PLACES
WELLHEAD EXTENSION, 20" x 0.812" WT X-56 x 20" x 0.812" RL-4S; 95 KSI PIN, BURST 3980 PSI (274 BAR)
30" x 1.5" WT, X-52 LOW PRESSURE HOUSING EXTENSION
20", RL-4S, 0.625"; 95 KSI BOX x ANTARES ER PIN, 12m X-OVER JOINT, P/N N30152-3
30" ST-2 FB BOX DOWN
VX/VT RING GASKET PROFILE
SEE DETAIL 'A' & 'B'
30" CONDUCTOR, ST-2, 1,00" WT, X-52
20" CASING, ANTARES ER, 133 LB/FT, N-80
13-3/8" CASING, NEW VAM, 72 LB/FT, Q-125
9-7/8" CASING, VAM ACE, 66.4 LB/FT, C-110
DETAIL 'A'
18-3/4" NOMINAL SEAT PROTECTOR INSTALLED, P/N H57034-1
DETAIL 'B'
18-3/4" x 13-3/8" WEARBUSHING INSTALLED, P/N H57224-1
16" LANDING SUB, P/N H57360-1
16" PACKOFF ASSY, P/N H57361-1
16" CASING HANGER, P/N H50320-1
OPTIONAL
16" SUBMUDLINE HANGER, COLLET TYPE
MS-700 Wellhead System
18-3/4" x 15,000 PSI
ABB Oil, Gas and Petrochemicals
Drawing Number: N600982-1

App A Operational experience, operational listing

Summary of Activities

Wellbore: 0015/03-007

27.04.2001	MADE UP 36" BHA AND SPUDDED WELL 15/3-7 07:30 HOURS ON 26 APRIL 2001. DRILLED 36" HOLE TO TD AT 189 M AND POOH WITH DRILLING ASSEMBLY. RAN 30" CONDUCTOR TO 188 M. CEMENTED CONDUCTOR IN PLACE. WAITED ON CEMENT.
28.04.2001	WAITED ON CEMENT. MADE UP 26" BHA. DRILLED OUT OF 30" SHOE AND NEW FORMATION TO 245 M RT. POOH TO CHANGE MWD DUE TO RESISTIVITY FAILURE
29.04.2001	POOH TO CHANGE MWD DUE TO RESISTIVITY FAILURE. RUN IN HOLE AND CONTINUED TO DRILL 26" HOLE FROM 245 M TO 594 M.
30.04.2001	DRILLED 26" HOLE FROM 594 M TO 897 M. OBSERVED A PRESSURE DROP OF 65 BAR AT 840 M. WORKED WITH POSSIBLE BIT BALLING. POOH. OBSERVED 26" BIT LOST IN HOLE.
01.05.2001	RACKED BACK BHA IN DERRICK AND MADE UP NODECO CEMENT HEAD. RIH WITH NEW 26" BIT. PASSED JUNK BIT AT 903 M. CONTINUED TO DRILL 26" HOLE FROM 903 M TO 935 M. PUMPED 15 M3 HI-VISC PILL AND CIRCULATED OUT THE SAME.
02.05.2001	DRILLED 26" HOLE. CIRCULATED HOLE CLEAN. DISPLACED WELL TO 1,20 SG MUD AND POOH.
03.05.2001	HELD PRE JOB MEETING PRIOR TO RUN 20" CASING. RAN 20" CASING. CIRCULATED AND CEMENTED 20" CASING. DISPLACE CEMENT IN PLACE.
04.05.2001	RELEASED RUNNING TOOL. WASHED WELL HEAD AREA. LAID DOWN LANDING STRING AND CEMENT HEAD. LAID DOWN 26" BHA AND MADE UP 17 1/2" BHA. RACKED THE SAME BACK IN DERRICK. PREPEARED TO RUN BOP.
05.05.2001	RAN BOP AND RISER.
06.05.2001	TESTED BOP.- PRESSURETESTED 20" CSG OK.- PERFORMED LEAKOFF TEST OK
07.05.2001	MADE UP 75 JOINTS 5 1/2" DRILLPIPE. DISPLACED HOLE TO 1,25 SG KCL MUD. DRILLED 17 1/2" HOLE FROM 948 M TO TO 1355 M.
08.05.2001	DRILLED 17 1/2" HOLE FROM 1355 M TO 1513 M. OBSERVED A PRESSURE DROP FROM 215 BAR TO 197 BAR AT 1513 M. POOH AND OBSERVED LOST MOTOR DRIVE SHAFT AND BIT
09.05.2001	FISHED FOR LOST MOTOR-SHAFT AND BIT.
10.05.2001	FISHED FOR LOST MOTOR-SHAFT AND BIT.
11.05.2001	FISHED FOR LOST MOTOR SHAFT AND BIT. RECOVERED FISH. MADE UP NEW BIT AND 17 1/2" ROTARY DRILLING ASSEMBLY. RIH TO CASING SHOE. SLIP AND CUT DRILL-LINE.
12.05.2001	RIH WITH 17 1/2" BHA. DRILLED 17 1/2" HOLE FROM 1512 M TO 1524 M. POOH TO CHANGE BIT DUE TO LOW ROP AND HIGH TORQUE. FOUND 8" DRILLING JAR BROKEN/NEARLY PARTED. REPLASED JAR AND M/U NEW 17 1/2" ROCK BIT. RIH TO 20" CASING SHOE. FUNCTION TESTED BOP. CONTINUED RIH TO TD. DRILLED 17 1/2" HOLE FROM 1524 M TO 1550 M
13.05.2001	DRILLED 17 1/2" HOLE FROM 1550 M TO 1641 M. POOH TO CHANGE BHA/BIT DUE TO LOW ROP AND HIGH TORQUE. L/D NB STAB AND PONY COLLAR. M/U NEW BIT AND VERTITRACK MOTOR AND RIH.
14.05.2001	DRILLED 17 1/2" HOLE FROM 1641 M TO 1944 M.
15.05.2001	DRILLED 17 1/2" HOLE FROM 1944 M TO 2273 M.
16.05.2001	DRILLED 17 1/2" HOLE FROM 2273 M TO 2439 M.
17.05.2001	DRILLED 17 1/2" HOLE FROM 2439 M TO 2554 M. STARTED TO POOH TO CHANGE BIT DUE TO LOW ROP.
18.05.2001	CONTINUED POOH. M/U CEMENT HEAD AND RACKED BACK IN DERRICK. M/U NEW BIT/BHA AND RIH TO 2410. REAMED IN HOLE FROM 2410 M TO 2554 M. DRILLED 17 1/2" HOLE FROM 2554 M TO 2556 M.
19.05.2001	DRILLED 17 1/2" HOLE FROM 2556 M TO 2660 M. STOPPED DRILLING DUE TO WASHOUT IN DDM INTERMEDIATE SUB. POOH FROM 2660 M TO 2545 M. CHANGED INTERMEDIATE SUB AND RIH TO TD. CONTINUED TO DRILL 17 1/2" HOLE FROM 2660 M TO 2679 M.
20.05.2001	DRILLED 17 1/2" HOLE FROM 2679 M TO 2740 M. STARTED ON SHORT TRIP TO 2410 M.
21.05.2001	MADE SHORT TRIP TO 2402 M. RIH TO TD AND CIRCULATED HOLE CLEAN. POOH AND L/D 17 1/2" BHA. INSTALLED HYDRAULIC HOSES ON CEMENT HEAD AND LOADED BALL FOR WIPER PLUG. RETRIEVED NOMINAL SEAT PROTACTOR. R/U TO RUN 13 3/8" CASING. MADE UP AND RAN 13 3/8" CASING TO 173 M.
22.05.2001	RAN 13 3/8" CASING FROM 173 M TO 2608 M. M/U 13 3/8" CASING HANGER.

Summary of Activities

Wellbore: 0015/03-007

23.05.2001	LANDED 13 3/8" CASING AND CEMENTED SAME. SET AND PRESSURE TESTED SEAL ASSEMBLY TO 410 BAR. PRESSURE TESTED BOP AND CSG. POOH WITH LANDING STRING. ATTEMPTED TO SET WEAR BUSHING, FOUND SEAL ASSEMBLY NOT PROPERLY SET. RETREIVED SEAL ASSEMBLY. RAN MILL & FLUSH TOOL AND CLEANED OUT SEAL POCKET AREA. RIH WITH NEW SEAL ASSEMBLY AND SET SAME.
24.05.2001	SET SEAL ASSEMBLY AND PRESSURE TESTED SAME. POOH AND L/D RUNNING TOOL. INSTALLED WEAR BUSHING. PRESSURE TESTED IBOP. M/U 12 1/4" BHA AND RIH. PERFORMED STRIP AND CHOKE DRILL. CONT. RIH AND TAGGED CEMENT AT 2705 M. DRILLED FLOAT COLLAR AND WASHED THROUGH SHOE TRACK.
25.05.2001	WASHED THROUGH SHOE TRACK AND RAT HOLE. DRILLED 3 M NEW FORMATION. ATTEMPTED TO PERFORM FIT - NEG. POOH 12 1/4" BHA. RIH 5" CMT STINGER. PERFORMED CMT SQUEZZE OF 13 3/8" CASING SHOE.
26.05.2001	SQUEZZED 13 3/8" CASING SHOE. POOH 5" CMT STINGER. SLIPPED AND CUT DRILL LINE.
27.05.2001	RIH 12 1/4" BHA TO 2592 M. WASHED DOWN AND DRILLED CEMENT INSIDE 13 3/8" CASING FROM 2648 M TO 2743 M. DRILLED 3 M NEW FORMATION. PERFORMED FIT EQV. TO 1,67 SG. MUDWEIGHT. DISPLACED TO 1,40 SG. OBM.
28.05.2001	DISPLACED WELL TO 1,40 SG. MED. DRILL 12 1/4" HOLE FROM 2746 M TO 2777 M. POOH 12 1/4" BHA FROM 2777 M.
29.05.2001	RIH 12 1/4" BHA ON 5 1/2" DRILL PIPE TO 2777 M. DRILLED 12 1/4" HOLE FROM 2777 M TO 2792 M. POOH 12 1/4" BHA DUE TO LOW ROP.
30.05.2001	POOH 12 1/4" BHA FROM 145 M. CHANGED BIT AND RIH. DRILLED 12 1/4" HOLE FROM 2792 M TO 2817 M.
31.05.2001	DRILLED 12 1/4" HOLE FROM 2817 M TO 2819 M. POOH 12 1/4" BHA. REPAIRED LEAK IN HYDRAULIC SYSTEM IN DERRICK. M/U 12 1/4" ROTARY BHA AND RIH TO 2776 M.
01.06.2001	DRILLED 12 1/4" HOLE FROM 2819 M TO 2981 M.
02.06.2001	DRILLED 12 1/4" HOLE FROM 2981 M TO 3140 M.
03.06.2001	DRILLED 12 1/4" HOLE FROM 3140 M TO 3340 M.
04.06.2001	DRILLED 12 1/4" HOLE FROM 3340 M TO 3491 M.
05.06.2001	DRILLED 12 1/4" HOLE FROM 3491 M TO 3618 M. INCREASED MUDWEIGHT TO 1,45 SG. WHILE DRILLING.
06.06.2001	DRILLED 12 1/4" HOLE FROM 3618 M TO 3627 M. POOH DUE TO LOW ROP. PRESSURE TESTED BOP TO 410 BAR. M/U 12 1/4" ROTARY BHA AND RIH TO 150 M.
07.06.2001	MWD FAILED SURFACE TEST. POOH AND CHANGED MWD. RIH 12 1/4" ROTARY BHA TO 3627 M. DRILLED 12 1/4" HOLE FROM 3627 M TO 3657 M.
08.06.2001	DRILLED 12 1/4" HOLE FROM 3657 M TO 3717 M
09.06.2001	POOH WITH 12 1/4" BHA. PERFORMED VSP LOGGING.
10.06.2001	PERFORMED DSI/LDT/GR LOGGING. R/D WL EQUIPMENT. M/U NEW 12 1/4" BHA. RIH TO 1539 M.
11.06.2001	RIH WITH 12 1/4" BHA FROM 1539 M TO 3721 M. DRILLED 12 1/4" HOLE TO 3800 M.
12.06.2001	DRILLED 12 1/4" HOLE FROM 3800 M TO 3996 M. CIRCULATED HOLE.
13.06.2001	POOH WITH 12 1/4" BHA ACCORDING TO HPHT PROCEDURE. L/O TORQUE WRENCH. M/U CEMENT STAND. INSTALLED TORQUE WRENCH.
14.06.2001	CHANGED SAVER SUB. INSTALLED TORQUE WRENCH ON TOP DRIVE. RETRIEVED WEAR BUSHING. R/U TO RUN CASING. REPAIRED CASING RUNNING EQUIPMENT. RAN 9 5/8" CASING TO 535 M.
15.06.2001	RAN 9 5/8" X 9 7/8" CASING FROM 535 M TO 2722 M.
16.06.2001	RAN 9 5/8" X 9 7/8" CASING AND CEMENTED SAME. SET AND TESTED SEAL ASSEMBLY.
17.06.2001	PRESSURE TESTED BOP. POOH WITH RUNNING TOOL AND L/D SAME. L/D CEMENT HEAD AND 12 1/4" BHA. M/U 9 5/8" RTTS AND RIH WITH SAME TO 2490 M.
18.06.2001	CONTINUED TO RIH WITH RTTS PACKER TO 3942 M. SET PACKER AND PRESSURE TESTED CASING TO 685 BAR FOR 15 MIN. RELEASED RTTS PACKER AND POOH WITH RTTS PACKER TO 1577 M WHILE L/D 5 1/2" DP.
19.06.2001	CONTINUED POOH WITH RTTS PACKER AND L/D SAME. M/U PLUG TYPE TEST TOOL AND RACKED BACK SAME. MADE UP 8 1/2" BHA AND RIH TO 211 M. CUT AND SLIPPED DRIL LINE. SERVICED DDM. CHANGED IBOP AND SAVER SUB ON DDM. PRESSURE TESTED SAME.

Summary of Activities

Wellbore: 0015/03-007

20.06.2001	RAN PLUG TYPE TEST PLUG AND PRESSURE TESTED BSR. RIH WITH 5" DRILL PIPE (RANGE 3), POOH AND L/D SAME. RIH WITH 8 1/2" BHA FROM 211 M TO 1900 M, WHILE P/U 5" DRILL PIPE FROM DECK. PERFORMED CHOKE AND STRIP DRILL.
21.06.2001	RIH WITH 8 1/2" BHA FROM 1900 M TO 3956 M. DRILLED OUT FLOAT COLLAR AND SHOE TRACK TO 3981 M WHILE INCREASING MUD WEIGHT TO 1,98 SG. CIRCULATED TO CONDITION MUD WHILE ATTEMPTING TO GET SIGNALS FROM MWD TOOL WITH 1200 LPM FLOWRATE.
22.06.2001	DOWNLINKED MWD. CONTINUED TO DRILL SHOE TRACK. DRILLED 3 M NEW FORMATION TO 3999 M. PERFORMED FIT TO 2,08 SG. DRILLED 8 1/2" HOLE TO 4010 M.
23.06.2001	DRILLED 8 1/2" HOLE FROM 4010 M TO 4063 M. CIRC BOTTOMS UP. MADE 5 STANDS SHORT TRIP. STARTED TO CIRC BOTTOMS UP TO EVALUATE TRIP GAS.
24.06.2001	CIRCULATED B/U. POOH ACCORDING TO HPHT PROCEDURES. CHANGED BIT AND BHA. RIH TO 2364 M. STRING PARTLY PLUGGED OFF AT 2364 M WHEN BREAKING CIRCULATION. ATTEMPTED TO REMOVE RESTRICTION, NEG. POOH.
25.06.2001	POOH WITH BIT AND OPENED PLUGGED NOZZLES. RIH. DRILLED 8 1/2" HOLE FROM 4063 M TO 4076 M.
26.06.2001	CIRCULATED BOTTOMS UP. MADE 5 STAND SHORT TRIP AND CIRC B/U. POOH. CHANGED BIT AND RIH TO 2890 M.
27.06.2001	RIH FROM 2890 M TO TD AT 4076 M. DRILLED 8 1/2" HOLE FROM 4076 M TO 4079 M. FLOWCHECKED. PUMPED 10 STAND OOH AND CONTINUED TO POOH. M/U CLEAN OUT ASSEMBLY AND RIH TO 900 M.
28.06.2001	RIH WITH 8 1/2" CLEAN OUT ASSEMBLY TO TD AT 4079 M. WORKED JUNK BASKET AND BIT ON BOTTOM. DRILLED 1 M NEW FORMATION. POOH. M/U 8 1/2" DRILLING ASSEMBLY.
29.06.2001	RIH. DRILLED 8 1/2" HOLE IN HPHT MODE 4080-4123 M.
30.06.2001	DRILLED 8 1/2" HOLE IN HPHT MODE 4123-4176 M.
01.07.2001	DRILLED 8 1/2" HOLE IN HPHT MODE 4176-4185 M. CIRCULATED. PERFORMED 5 STDS SHORT TRIP. CIRCULATED. INCREASED MW TO 2,00 SG. PERFORMED 5 STDS SHORT TRIP. CIRCULATED. POOH ACCORDING HPHT PROCEDURES TO 285 M.
02.07.2001	POOH AND LD BIT. TESTED BOP. CHANGED MWD. RIH 8 1/2" BIT. BROKE IN BIT AND STARTED DRILLING 8 1/2" HOLE AT 4185 M.
03.07.2001	DRILLED 8 1/2" HOLE IN HPHT MODE 4185-4260 M.
04.07.2001	PERFORMED 5 STD SHORT TRIP. CIRCULATED. PUMPED OUT OF OPEN HOLE. CHANGED BRAKE BANDS ON DRAW WORKS. POOH AS PER HPHT PROCEDURE.
05.07.2001	RIH WITH 8 1/2" PDC BIT AS PER HPHT PROCEDURE. DRILLED 8 1/2" HOLE FROM 4260-4279 M.
06.07.2001	DRILLED 8 1/2" HOLE IN HPHT MODE FROM 4279 - 4322 M.
07.07.2001	DRILLED 8 1/2" HOLE TO 4349 M. PERFORMED 5 STANDS WIPERTRIP. CIRCULATED BOTTOMS UP, MAX GAS 6,9 %. POOH TO 2778 M ACCORDING TO HPHT PROCEDURES. FUNCTION TESTED BOP.
08.07.2001	POOH AND CHANGED BIT AND BHA. CHANGED WASH PIPE. RIH WITH 8 1/2" TURBINE BHA TO 3969 M. SLIPPED AND CUT DRILL-LINE AT SHOE. SERVICED RIG.
09.07.2001	RIH WITH 8 1/2" TURBINE BHA, DRILLED 8 1/2" HOLE FROM 4349 M TO 4389 M ACCORDING TO HPHT PROCEDURES. EXPERIENCED SOME MWD DECODING PROBLEMS.
10.07.2001	DRILLED 8 1/2" HOLE WITH TURBINE FROM 4374 M TO 4439 M.
11.07.2001	DRILLED 8 1/2" HOLE WITH TURBINE FROM 4439 M TO 4465 M. MADE 5 STANDS WIPERTRIP AND CIRCULATED BOTTOMS UP. PUMPED OUT OF OPEN HOLE TO 4100 M.
12.07.2001	POOH WITH TURBINE BHA. CHANGED BIT AND BHA. RIH TO 1150 M.
13.07.2001	RIH TO BTM AT 4465 M. DRILLED 8 1/2" HOLE TO 4511 M.
14.07.2001	DRILLED 8 1/2" HOLE FROM 4511 M TO 4545 M, ABORTED DRILLING DUE TO HOLEPROBLEMS, WENT STUCK SEVERAL TIMES. PUMPED OOH TO 4468 M. FLOWCHECKED - STATIC. PUMPED / ROTATED OOH TO SHOE AT 3990 M. FLOWCHECKED, SLUGGED PIPE AND POOH TO 3400 M.
15.07.2001	POOH WITH DRILLING ASSEMBLY. DOWNLOADED CDR/MWD. MU AND RIH WITH 8 1/2" CLEANOUT ASSEMBLY WITH JUNK BIT AND JUNK BASKETS TO 4077 M
16.07.2001	RIH TO 4440 M. REAMED AND WASHED TO TD AT 4545 M. WORKED JUNK BASKETS. DRILLED 8 1/2" HOLE TO 4546 M. OBSERVED WELL - STATIC. PUMPED OOH TO CASING SHOE AT 3990 M. OBSERVED WELL - STATIC. SLUGGED PIPE AND POOH ACC. TO HPHT PROCEDURE. RIH WITH TESTPLUG.
17.07.2001	PRESSURE TESTED BOPS. MU AND RIH WITH 8 1/2" DRILLING ASSEMBLY TO 3352 M.
18.07.2001	RIH TO TD AT 4546 M. DRILLED 8 1/2" HOLE TO 4580 M, DRILLING BREAK. OBSERVED WELL AND CIRCULATED BU. CONTINUED TO DRILL TO 4596 M.
19.07.2001	DRILLED 8 1/2" HOLE TO CORING POINT AT 4609 M. CIRCULATED BU. PERFORMED 5 STANDS WIPER TRIP. CIRCULATED BU. PUMPED OOH TO CASING SHOE AT 3990 M. INSTALLED DDM LOOP PROTECTION. SLUGGED PIPE AND POOH TO 2140 M ACC. TO HPHT PROCEDURE.
20.07.2001	POOH WITH 8 1/2" DRILLING ASSEMBLY. MU AND RIH WITH 27 M CORING ASSEMBLY TO 2650 M.
21.07.2001	RIH WITH COREBBL TO 3970 M. SLIPPED AND CUT DRLG LINE. CONT RIH TO TD AT 4609 M. CIRC. AND COND. MUD. CUT CORE NO 1 FROM 4609 M TO 4616,5 M, NO FURTHER PROGRESS. CIRC BU. FLOW CHECKED. PERFORMED 5 STAND WIPERTRIP.

Summary of Activities

Wellbore: 0015/03-007

22.07.2001	CIRCULATED BU AT TD 4616,5 M. PUMPED / POOH ACC. TO HPHT PROCEDURE. RECOVERED CORE. FOUND COREHEAD RINGED OUT DUE TO JUNK IN HOLE. MU REVERSE CIRC. JUNK BASKET WITH MAGNET INSERT AND RIH.
23.07.2001	RIH WITH 7 7/8" REVERSE CIRCULATING JUNKBASKET WITH MAGNET INSERT TO 4600 M. CIRCULATED BU. DROPPED BALL AND CIRC. SAME DOWN. WORKED JUNKBASKET AT TD 4616,5 M. OBSERVED WELL AND PUMPED / POOH TO 3660 M ACC. TO HPHT PROCEDURE.
24.07.2001	POOH WITH REV. CIRC. JUNK BASKET, FOUND ONE PIECE OF TONGDIE. MU AND RIH WITH 54 M COREBBL TO 2310 M..
25.07.2001	RIH FROM 2310 M TO 3798 M. REPAIRED RIG. CONT TO RIH TO TD AT 4616,5 M. CIRCULATED BU. CUT CORE NO 2 FROM 4616,5 M TO 4619 M, NO FURTHER PROGRESS. OBSERVED WELL - STATIC. PERFORMED 5 STANDS SHORT TRIP. CIRCULATED BU.
26.07.2001	PUMPED OOH FROM TD AT 4619 M TO CASING SHOE AT 3990 M. SLIPPED AND CUT DRILLING LINE. POOH ACC. TO HPHT PROCEDURE. RECOVERED 1 M CORE, 40 % RECOVERY. MU FLAT BTM JUNK MILL AND RIH TO 1940 M.
27.07.2001	RIH WITH JUNK MILL AND JUNK BASKETS TO TD AT 4619 M. WORKED JUNK MILL AND JUNK BASKETS ON BOTTOM. DRILLED 1,5 M NEW FORMATION TO 4620,5 M. FLOW CHECKED. PUMPED / POOH ACC TO HPHT PROCEDURE.
28.07.2001	POOH WITH JUNK MILL AND JUNK SUBS. RECOVERED 100 GRAM STEEL AND 50 GRAM ALUMINIUM. M/U HYDRAULIC JET PUMP BAILER ASSEMBLY AND RIH.
29.07.2001	RIH WITH JET PUMP BAILER ASSEMBLY TO BOTTOM AT 4620,5. WORKED JET PUMP ON BOTTOM. OPENED CIRC SUB AND CIRCULATED BOTTOMS UP. PUMPED/POOH ACC TO HPHT PROCEDURE. STARTED TO M/U 180 FT CORE BARREL.
30.07.2001	M/U 180 FT CORE BARREL ASSEMBLY. RIH TO BOTTOM. CUT CORE NO 3 FROM 4620 M TO 4625 M.
31.07.2001	CUT CORE NO 3 FROM 4525 M TO 4635 M. PERFORMED 5 STAND SHORT TRIP. CIRCULATED BOTTOMS UP. FLOWCHECKED WELL. PUMPED / POOH ACC TO HPHT PROCEDURE.
01.08.2001	POOH WITH CORE NO. 3. RECOVERED 13,1 M (90,3% RECOVERY). PRESSURE TESTED BOP. M/U AND RIH WITH 8 1/2" DRILLING ASSEMBLY TO 625 M.
02.08.2001	RIH WITH 8 1/2" BHA. REAMED AND LOGGED CORED INTERVAL WITH MWD. DRILLED 8 1/2" HOLE FROM 4635 M TO 4643 M. FLOW CHECKED WELL AND CIRCULATED BOTTOMS UP.
03.08.2001	PUMPED/POOH WITH 8 1/2" DRILLING ASSEMBLY. M/U 90 FT CORE BARREL AND RIH WITH SAME.
04.08.2001	RIH WITH CORE ASSEMBLY TO BOTTOM. CUT CORE NO 4 FROM 4634 M TO 4670 M (27 M). CIRCULATED BOTTOMS UP.
05.08.2001	FLOWCHECKED WELL, PUMPED/ POOH WITH CORE NO.4. L/D SAME.M/U 8 1/2" DRILLING ASSEMBLY. RIH
06.08.2001	RIH WITH 8 1/2" BHA TO 2803 M. SERVICED DDM. CONTINUED RIH. LOGGED CORED INTERVAL WITH MWD. DRILLED 8 1/2" HOLE FROM 4670 M TO 4691 M.
07.08.2001	DRILLED 8 1/2" HOLE FROM 4691 M TO 4731 M.
08.08.2001	DRILLED 8 1/2" HOLE TO 4755 M. FLOW CHECKED WELL. PUMPED / POOH.
09.08.2001	POOH WITH 8 1/2" BHA. SLIPPED AND CUT. CHANGED BIT. DUMPED MWD. M/U BHA WITH SMWD TOOL. RIH WITH SAME.
10.08.2001	WASHED DOWN 4726-4755 M. BROKE IN BIT AND DRILLED 4755-4778 M. PUMPED OUT OF OPEN HOLE 4778-4148 M.
11.08.2001	POOH AS PER HPHT PROCEDURE. LD MWD. LD CORE ASSEMBLY. PU 11 STANDS 3 1/2" DP. RU SCHLUMBERGER. RIH RUN#1 AIT-DSI-GR-EMS-ACTS.
12.08.2001	LOGGED RUN#1 (AIT-DSI-EMS-GR-ACTS). PERFORMED RUN#2 (IPLT-ACTS). RIH RUN#3 (CMR+-ECS-GR-ACTS).
13.08.2001	LOGGED RUN#3 (CMR+-ECS-GR-ACTS). RIH RUN#4 (MDT-GR-ACTS). RECORED 21 PRESSURE POINTS. OBSERVED LOSS OF AUXILARY POWER IN TOOL. POOH. MU TOOL STRING FOR RUN#5 (MDT PRESSURE POINTS + SAMPLING).
14.08.2001	RIH RUN#5 (MDT SAMPLING+PRESSURE POINTS). RECORDED TOTAL 46 PRESSURE POINTS (13 PRESSURES, 25 TIGHT, 1 SUPERCHARGED AND 7 LOST SEAL). SAMPLED AT 4224 M.
15.08.2001	SAMPLED AT 4610.1 M. MDT LOGGING CABLE STUCK. RU AND STRIPPED OVER STUCK LOGGING CABLE TO 55 M.
16.08.2001	RIH WHILE STRIPPING OVER STUCK LOGGING CABLE 55-3947 M. BROKE CIRCULATION AT 1009 M, 2013 M AND 2964 M.
17.08.2001	RIH WHILE STRIPPING OVER STUCK LOGGING CABLE FROM 3976 M TO 4424 M, PULLED CABLE / LOGGING TOOL (MDT) FREE. CIRCULATED BU. PULLED LOGGING TOOL INTO OVERSHOT. ATTEMPTED TO MAKE AN ELECTRICAL DISCONNECT, NEG. CUT CABLE AT SURFACE AND POOH TO 1700 M WITH FISH.
18.08.2001	POOH WITH FISH / LOGGING TOOL. LD SAME. MU AND RIH WITH 8 1/2" ROTARY ASSY TO 4412 M.
19.08.2001	WASHED / REAMED FROM 4412 M TO TD AT 4778 M. DRILLED 8 1/2" HOLE TO 4818 M. CIRC. BU.
20.08.2001	PERFORMED SHORT TRIP FROM TD AT 4818 M TO 4691 M. RIH TO TD. CIRCULATED BU. PUMPED OOH TO CASING SHOE AT 3990 M. SLUGGED PIPE AND POOH ACC. TO HPHT PROCEDURE. LD BHA. PRESSURE TESTED BOP.
21.08.2001	PRESSURE TESTED BOP. RU WL AND RAN LOG NO 1, IPLT-AIT-ACTS-GR, LOG NO 2, MCST-GR AND PREPARED TO RUN LOG NO 3, VSP-GR.
22.08.2001	WL LOGGING: PERFORMED RUN NO 3, VSP - GR. RIH LOG NO 4, CST - GR, DISCONTINUED RUN DUE TO POWERFAILURE. POOH FOR TROUBLESHOOTING, FOUND CONDUCTING WIRE TWISTED OFF IN CABLE HEAD. RD WL. RU AND STARTED TO PRESSURE TEST IBOP AND MUDHOSE ON DDM.
23.08.2001	PRESSURE TESTED IBOP AND MUDHOSE ON DDM. RAN WL, RUN NO 5, MSCT-GR AS PER PROGRAM. MU DIVERTER TOOL, 3 1/2" CEMENT STINGER AND RIH.
24.08.2001	RIH WITH CEMENT STINGER TO 4686 M. WASHED TO TD AT 4818 M. CIRCULATED BU. MIXED AND SET OPEN HOLE CEMENT PLUGS, PLUG NO 1 FROM TD TO 4550 M. PLUG NO 2 FROM 4540 M TO 4300 M. POOH TO 4290 M. CIRCULATE BU.

Summary of Activities

Wellbore: 0015/03-007

25.08.2001	P & A : MIXED AND SET CEMENT PLUG NO 3 FROM 4290 M TO 4050 M AND NO 4 FROM 4040 M TO 3850 M. SLIPPED AND CUT DRILLING LINE. POOH, LD EXCESS 5" DP, TOT 90 JNTS. CONT TO POOH TO 2270 M.
26.08.2001	POOH WITH CEMENT STINGER. MU 8 1/2" BIT AND RIH. TAGGED CEMENT AT 3774 M. DRESSED CEMENT TO 3778 M. LOAD AND PRESSURE TESTED CEMENT PLUG . POOH, LD EXCESS DP.
27.08.2001	POOH, LD EXCESS DP + BHA. MU 9 7/8" CASING CUTTER AND RIH. CUT CASING AT 522 M. PULLED WEARBUSHING.
28.08.2001	RIH AND RETRIEVED 9 7/8" CASING. PULLED AND LD SAME. SET 13 3/8" BRIDGEPLUG AT 446 M. PRESSURE TEST PLUG / CASING TO 125 BAR. DISPLACED WELL TO 1,37 SG WATERBASED MUD. CUT 13 3/8" CASING AT 420 M. POOH. LD CUTTING ASSY. MU 13 3/8" SEAL ASSEMBLY RETRIEVING TOOL.
29.08.2001	RETRIEVED AND PULLED SEAL ASSY. RETRIEVED AND LD 24 JNTS 13 3/8" CASING. SET AND TESTED 20" BRIDGEPLUG AT 370 M. DISPLACED WELL TO SW.
30.08.2001	DISPLACED WELL TO SW. MIXED AND SET SURFACE CEMENT PLUG FROM 370 M TO 170 M. POOH TO 150 M. REVERSE CIRC., NO CEMENT IN RETURN. JETWASHED RISERS AND BOP. PREPARED AND PULLED BOP / RISERS.
31.08.2001	PULLED BOP AND RISER. CUT 20" CASING AND 30" CONDUCTOR AT 131,6 M. POOH WITH PGB AND WELLHEAD. DEBALLASTED RIG.
01.09.2001	DEBALLASTED RIG. PULLED ANCHORS. OPERATION ON WELL 15/3-7 ENDED AT AUGUST 31 AT 17:00 HRS WEST ALPHA ON CONTRACT FOR NORSK AGIP. THE RIG IS ON TOW.

App B Bottom hole assemblies (BHA)

BHA report

Wellbore: 0015/03-007

BHA seq: 1 **BHA category:** Drilling **BHA description:** 36" hole opening

BHA no: 1

String component	OD in	ID in	Length m	Acc length m
HOLE OPENER			6,08	6,08
DRILL COLLAR	9,500	3,063	27,19	33,27
CROSSOVER TOOL	9,375	3,000	0,97	34,24
DRILL COLLAR	8,000	2,896	53,03	87,27
CROSSOVER TOOL	8,000	2,750	0,77	88,04
HW DRILL PIPE	5,500	3,292	26,18	114,22

BHA seq: 2 **BHA category:** **BHA description:**

BHA no: 2

String component	OD in	ID in	Length m	Acc length m
BIT, TRI CONE	26,000		0,63	0,63
STABILIZER, NB	26,000	3,000	2,32	2,95
DRILL COLLAR	9,500		2,87	5,82
STABILIZER	26,000	3,000	2,48	8,30
CROSSOVER TOOL	9,500	3,000	0,90	9,20
MWD CDR	9,000	2,813	6,99	16,19
MWD, PULSAR	8,250	2,813	7,95	24,14
SAVER SUB	8,250	2,813	0,46	24,60
STABILIZER	26,000	2,750	2,22	26,82
DRILL COLLAR	7,750	2,875	79,20	106,02
JAR	7,675	2,750	9,70	115,72
DRILL COLLAR	7,675	2,875	18,25	133,97
CROSSOVER TOOL	8,000	2,750	0,77	134,74
HW DRILL PIPE	6,750	3,250	44,69	179,43

BHA seq: 3 **BHA category:** **BHA description:**

BHA no: 3

String component	OD in	ID in	Length m	Acc length m
BIT, TRI CONE	26,000		0,63	0,63
STABILIZER, NB	26,000	3,000	2,32	2,95
DRILL COLLAR	9,500		2,87	5,82
STABILIZER	26,000	3,000	2,48	8,30
CROSSOVER TOOL	9,500	3,000	0,90	9,20
MWD CDR	9,000	2,813	6,70	15,90
MWD, PULSAR	8,250	2,813	7,95	23,85
SAVER SUB	8,250	2,813	0,46	24,31
STABILIZER	26,000	2,750	2,22	26,53
DRILL COLLAR	7,750	2,875	79,20	105,73
JAR	7,675	2,750	9,70	115,43
DRILL COLLAR	7,675	2,875	18,25	133,68
CROSSOVER TOOL	8,000	2,750	0,77	134,45
HW DRILL PIPE	6,750	3,250	44,69	179,14

BHA seq: 4 **BHA category:** **BHA description:**

BHA no: 4

String component	OD in	ID in	Length m	Acc length m
BIT, TRI CONE	26,000		0,56	0,56
STABILIZER, NB	26,000	3,000	1,88	2,44
DRILL COLLAR	9,500	3,000	9,10	11,54
STABILIZER	26,000	3,000	2,41	13,95
CROSSOVER TOOL	9,500	3,000	0,90	14,85
MWD CDR	8,938	2,813	6,70	21,55
MWD, PULSAR	8,250	2,813	7,95	29,50
SAVER SUB	8,250	2,813	0,46	29,96
STABILIZER	26,000	2,750	2,22	32,18

BHA report

Wellbore: 0015/03-007

BHA seq: 4 **BHA category:** **BHA description:**
BHA no: 4

String component	OD in	ID in	Length m	Acc length m
DRILL COLLAR	7,750	2,875	79,20	111,38
JAR	7,675	2,750	9,70	121,08
DRILL COLLAR	7,675	2,875	18,25	139,33
CROSSOVER TOOL	8,000	2,750	0,77	140,10
HW DRILL PIPE	6,750	3,250	44,69	184,79

BHA seq: 5 **BHA category:** **BHA description:**
BHA no: 5

String component	OD in	ID in	Length m	Acc length m
BIT, PDC	17,500		0,60	0,60
MUD MOTOR	17,000		10,42	11,02
STABILIZER	17,500		2,43	13,45
FLOAT SUB	9,670		0,79	14,24
CROSSOVER TOOL	9,500		0,90	15,14
MWD CDR	9,000		6,92	22,06
MWD TOOL	8,438		7,97	30,03
SAVER SUB	8,281	2,281	0,47	30,50
STABILIZER	17,250	3,000	2,57	33,07
DRILL COLLAR	7,920	2,980	79,20	112,27
JAR	7,630	2,750	9,70	121,97
DRILL COLLAR	7,781	2,875	18,25	140,22
CROSSOVER TOOL	8,000	2,750	0,77	140,99
HW DRILL PIPE	6,813	3,510	44,69	185,68

BHA seq: 6 **BHA category:** **BHA description:**
BHA no: 6

String component	OD in	ID in	Length m	Acc length m
LIP GUIDE	15,000	9,750	0,44	0,44
OVERSHOT	8,063	3,500	0,92	1,36
BUMPER SUB	8,063	3,500	1,54	2,90
JAR	8,031	3,063	2,39	5,29
DRILL COLLAR	7,833	2,880	52,77	58,06
CROSSOVER TOOL	8,000	2,750	0,77	58,83
HW DRILL PIPE	6,813	3,313	26,18	85,01

BHA seq: 7 **BHA category:** **BHA description:**
BHA no:

String component	OD in	ID in	Length m	Acc length m
BIT, PDC	17,500		0,60	0,60
MUD MOTOR	17,000		10,42	11,02
STABILIZER	17,500		2,43	13,45
FLOAT SUB	9,670		0,79	14,24
CROSSOVER TOOL	9,500		0,90	15,14
MWD CDR	9,000		6,92	22,06
MWD TOOL	8,438		7,97	30,03
SAVER SUB	8,281	2,281	0,47	30,50
STABILIZER	17,250	3,000	2,57	33,07
DRILL COLLAR	7,920	2,980	79,20	112,27
JAR	7,630	2,750	9,70	121,97
DRILL COLLAR	7,781	2,875	18,25	140,22
CROSSOVER TOOL	8,000	2,750	0,77	140,99
HW DRILL PIPE	6,813	3,510	44,69	185,68

BHA report

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BHA seq: 8 **BHA category:** **BHA description:**
BHA no:

String component	OD in	ID in	Length m	Acc length m
LIP GUIDE	15,000	9,750	0,44	0,44
OVERSHOT	8,063	3,500	0,92	1,36
BUMPER SUB	8,063	3,500	1,54	2,90
JAR	8,031	3,063	2,39	5,29
DRILL COLLAR	7,833	2,880	52,77	58,06
CROSSOVER TOOL	8,000	2,750	0,77	58,83
HW DRILL PIPE	6,813	3,313	26,18	85,01

BHA seq: 9 **BHA category:** **BHA description:**
BHA no: 7

String component	OD in	ID in	Length m	Acc length m
OVERSHOT	11,781	6,000	2,43	2,43
BUMPER SUB	8,063	3,500	1,54	3,97
FISHING JAR	8,031	3,063	2,39	6,36
DRILL COLLAR	7,750	2,875	26,60	32,96
ACCELERATOR	8,031	3,031	4,08	37,04
XO SUB	8,000	2,750	0,77	37,81
HW DRILL PIPE	6,750	3,250	26,18	63,99

BHA seq: 10 **BHA category:** **BHA description:**
BHA no:

String component	OD in	ID in	Length m	Acc length m
LIP GUIDE	15,000	9,750	0,44	0,44
OVERSHOT	8,063	3,500	0,92	1,36
BUMPER SUB	8,063	3,500	1,54	2,90
JAR	8,031	3,063	2,39	5,29
DRILL COLLAR	7,833	2,880	52,77	58,06
CROSSOVER TOOL	8,000	2,750	0,77	58,83
HW DRILL PIPE	6,813	3,313	26,18	85,01

BHA seq: 11 **BHA category:** **BHA description:**
BHA no:

String component	OD in	ID in	Length m	Acc length m
OVERSHOT	11,781	6,000	3,34	3,34
BUMPER SUB	8,063	3,500	1,54	4,88
FISHING JAR	8,031	3,063	2,39	7,27
DRILL COLLAR	7,750	2,875	26,60	33,87
ACCELERATOR	8,031	3,031	4,08	37,95
XO SUB	8,000	2,750	0,77	38,72
HW DRILL PIPE	6,750	3,250	26,18	64,90

BHA seq: 12 **BHA category:** **BHA description:**
BHA no: 8

String component	OD in	ID in	Length m	Acc length m
HW DRILL PIPE	6,750	3,250	44,69	44,69
MWD CDR				44,69
SAVER SUB				44,69
MWD DIRECTIONAL				44,69
SAVER SUB				44,69
STAB STRING				44,69
DRILL COLLAR				44,69
JAR				44,69
DRILL COLLAR				44,69
XO SUB				44,69
HW DRILL PIPE				44,69

BHA report

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BHA seq: 13 **BHA category:** **BHA description:**
BHA no:

String component	OD in	ID in	Length m	Acc length m
OVERSHOT	11,781	6,000	3,34	3,34
BUMPER SUB	8,063	3,500	1,54	4,88
FISHING JAR	8,031	3,063	2,39	7,27
DRILL COLLAR	7,750	2,875	26,60	33,87
ACCELERATOR	8,031	3,031	4,08	37,95
XO SUB	8,000	2,750	0,77	38,72
HW DRILL PIPE	6,750	3,250	26,18	64,90

BHA seq: 14 **BHA category:** **BHA description:**
BHA no:

String component	OD in	ID in	Length m	Acc length m
BIT, PDC	17,500		0,44	0,44
STAB. NB W/FLOAT	17,500	3,000	2,47	2,91
DRILL COLLAR	9,563	3,000	2,99	5,90
STAB STRING	17,500	3,063	2,37	8,27
X-OVER	9,563	3,000	0,89	9,16
SUB	8,625		0,33	9,49
MWD CDR	9,094		6,51	16,00
SAVER SUB	8,563		0,46	16,46
MWD DIRECTIONAL	8,406		7,48	23,94
SAVER SUB	8,531		0,48	24,42
STAB STRING	17,250	2,800	2,07	26,49
DRILL COLLAR	7,813	2,938	79,20	105,69
JAR	7,625	2,750	9,70	115,39
DRILL COLLAR	7,813	2,875	18,25	133,64
XO SUB	8,000	2,750	0,77	134,41
HW DRILL PIPE	6,750	3,250	44,69	179,10

BHA seq: 15 **BHA category:** **BHA description:**
BHA no: 9

String component	OD in	ID in	Length m	Acc length m
BIT, TRI CONE	17,500		0,44	0,44
STAB. NB W/FLOAT	17,500	3,000	2,47	2,91
DRILL COLLAR	9,563	3,000	2,99	5,90
STAB STRING	17,500	3,063	2,37	8,27
X-OVER	9,563	3,000	0,89	9,16
SUB	8,625		0,33	9,49
MWD CDR	9,094		6,51	16,00
SAVER SUB	8,563		0,46	16,46
MWD DIRECTIONAL	8,406		7,48	23,94
SAVER SUB	8,531		0,48	24,42
STAB STRING	17,250	2,800	2,07	26,49
DRILL COLLAR	7,813	2,938	79,20	105,69
JAR	7,625	2,750	9,51	115,20
DRILL COLLAR	7,813	2,875	18,25	133,45
XO SUB	8,000	2,750	0,77	134,22
HW DRILL PIPE	6,750	3,250	44,69	178,91

BHA seq: 16 **BHA category:** **BHA description:**
BHA no: 10

String component	OD in	ID in	Length m	Acc length m
BIT, TRI CONE	17,500		0,43	0,43
MUD MOTOR	17,000		10,43	10,86
STABILIZER	17,500		2,37	13,23
FLOAT SUB	9,670		0,89	14,12

BHA report

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BHA seq: 16 **BHA category:** **BHA description:**
BHA no: 10

String component	OD in	ID in	Length m	Acc length m
CROSSOVER TOOL	9,500		0,89	15,01
MWD CDR	9,000		6,92	21,93
MWD TOOL	8,438		7,97	29,90
SAVER SUB	8,281	2,281	0,48	30,38
STABILIZER	17,250	3,000	2,07	32,45
DRILL COLLAR	7,920	2,980	79,20	111,65
JAR	7,630	2,750	9,51	121,16
DRILL COLLAR	7,781	2,875	18,25	139,41
CROSSOVER TOOL	8,000	2,750	0,77	140,18
HW DRILL PIPE	6,813	3,510	44,69	184,87

BHA seq: 17 **BHA category:** **BHA description:**
BHA no: 11

String component	OD in	ID in	Length m	Acc length m
BIT, TRI CONE	17,500		0,41	0,41
MUD MOTOR	17,000		10,43	10,84
STABILIZER	17,250		2,65	13,49
FLOAT SUB	9,406		0,89	14,38
CROSSOVER TOOL	9,562		0,89	15,27
MWD CDR	9,000		6,84	22,11
MWD TOOL	8,406		7,94	30,05
SAVER SUB	8,531	2,281	0,48	30,53
STABILIZER	17,250	3,000	2,07	32,60
DRILL COLLAR	8,000	2,980	102,07	134,67
JAR	8,000	2,750	9,51	144,18
DRILL COLLAR	8,000	2,875	18,25	162,43
CROSSOVER TOOL	8,000	2,750	0,77	163,20
HW DRILL PIPE	6,813	3,510	44,69	207,89

BHA seq: 18 **BHA category:** **BHA description:**
BHA no: 12

String component	OD in	ID in	Length m	Acc length m
BIT, PDC	12,250		0,37	0,37
MUD MOTOR	9,500		10,08	10,45
XO SUB	9,500	2,875	0,98	11,43
ROLLER REAMER	12,250	3,000	2,86	14,29
FLOAT SUB	8,000	2,812	0,96	15,25
MWD CDR	8,375		6,91	22,16
MWD TOOL	8,375		8,32	30,48
LWD TOOL	12,125		8,89	39,37
LWD TOOL CDN	12,250		8,43	47,80
DRILL COLLAR	8,000	3,000	79,90	127,70
JAR	8,000	3,000	9,60	137,30
DRILL COLLAR	8,000	3,000	18,25	155,55
CROSSOVER TOOL	8,000	3,000	1,21	156,76
HW DRILL PIPE	6,813	3,510	75,52	232,28

BHA seq: 19 **BHA category:** **BHA description:**
BHA no: 13

String component	OD in	ID in	Length m	Acc length m
BIT, PDC	12,250		0,37	0,37
MUD MOTOR	9,500		10,08	10,45
XO SUB	9,500	2,875	0,98	11,43
ROLLER REAMER	12,250	3,000	2,86	14,29
FLOAT SUB	8,000	2,812	0,96	15,25

BHA report

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BHA seq: 19 **BHA category:** **BHA description:**
BHA no: 13

String component	OD in	ID in	Length m	Acc length m
MWD CDR	8,375		6,91	22,16
MWD TOOL	8,375		8,32	30,48
LWD TOOL	12,125		7,55	38,03
DRILL COLLAR	8,000	3,000	79,90	117,93
JAR	8,000	3,000	9,60	127,53
DRILL COLLAR	8,000	3,000	18,25	145,78
CROSSOVER TOOL	8,000	3,000	1,21	146,99
HW DRILL PIPE	6,813	3,510	72,52	219,51

BHA seq: 20 **BHA category:** **BHA description:**
BHA no: 14

String component	OD in	ID in	Length m	Acc length m
BIT, TRI CONE	12,250		0,33	0,33
MUD MOTOR	9,500		10,08	10,41
XO SUB	9,500	2,875	0,98	11,39
ROLLER REAMER	12,250	3,000	2,86	14,25
FLOAT SUB	8,000	2,812	0,96	15,21
MWD CDR	8,375		6,91	22,12
MWD TOOL	8,375		8,32	30,44
LWD TOOL	12,125		7,55	37,99
DRILL COLLAR	8,000	3,000	79,90	117,89
JAR	8,000	3,000	9,60	127,49
DRILL COLLAR	8,000	3,000	18,25	145,74
CROSSOVER TOOL	8,000	3,000	1,21	146,95
HW DRILL PIPE	6,813	3,510	72,52	219,47

BHA seq: 21 **BHA category:** **BHA description:**
BHA no: 15

String component	OD in	ID in	Length m	Acc length m
BIT, PDC	12,250		0,37	0,37
STAB. NB W/FLOAT	12,250		2,23	2,60
DRILL COLLAR	8,000	2,875	9,06	11,66
STAB STRING	12,250	3,000	2,22	13,88
MWD CDR	8,375		6,91	20,79
MWD TOOL	8,375		8,32	29,11
X-OVER	8,313	4,250	0,47	29,58
DRILL COLLAR	8,000	3,000	79,90	109,48
JAR	8,000	3,000	9,60	119,08
DRILL COLLAR	8,000	3,000	18,25	137,33
CROSSOVER TOOL	8,000	3,000	1,21	138,54
HW DRILL PIPE	6,813	3,510	72,52	211,06

BHA seq: 22 **BHA category:** **BHA description:**
BHA no: 16

String component	OD in	ID in	Length m	Acc length m
BIT, PDC	12,250		0,36	0,36
STAB. NB W/FLOAT	12,250		2,22	2,58
DRILL COLLAR	8,000	2,875	9,06	11,64
STAB STRING	12,220	3,000	2,32	13,96
MWD CDR	8,375		6,91	20,87
MWD TOOL	8,375		8,43	29,30
X-OVER	8,313	4,250	0,47	29,77
DRILL COLLAR	8,000	3,000	79,90	109,67
JAR	8,000	3,000	9,60	119,27
DRILL COLLAR	8,000	3,000	18,25	137,52

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BHA seq: 22 **BHA category:** **BHA description:**
BHA no: 16

String component	OD in	ID in	Length m	Acc length m
CROSSOVER TOOL	8,000	3,000	1,21	138,73
HW DRILL PIPE	6,813	3,510	72,52	211,25

BHA seq: 23 **BHA category:** **BHA description:**
BHA no: 17

String component	OD in	ID in	Length m	Acc length m
BIT, PDC	12,250		0,36	0,36
STAB. NB W/FLOAT	12,250		2,12	2,48
DRILL COLLAR	8,000	2,875	9,06	11,54
ROLLER REAMER	12,250	2,875	2,86	14,40
MWD CDR	8,375		6,91	21,31
MWD TOOL	8,406		7,93	29,24
X-OVER	8,313	4,250	0,47	29,71
ROLLER REAMER	12,250	2,875	2,85	32,56
DRILL COLLAR	8,000	2,875	79,90	112,46
JAR	7,938	3,000	9,75	122,21
DRILL COLLAR	8,000	2,875	18,25	140,46
X-OVER	8,000	3,000	1,21	141,67
HW DRILL PIPE	5,500	3,250	72,52	214,19
DART SUB	7,000	2,938	0,79	214,98

BHA seq: 24 **BHA category:** Drilling **BHA description:** 8 1/2" rotary assy w/Vision675
BHA no: 18

String component	OD in	ID in	Length m	Acc length m
BIT, PDC	8,500		0,32	0,32
ROLLER REAMER, NB	8,500	2,750	1,86	2,18
VISION675	6,750		6,17	8,35
STAB STRING	8,500		1,50	9,85
MWD TOOL	6,750		7,79	17,64
SAVER SUB	6,750		0,50	18,14
ROLLER REAMER	8,500	2,250	2,04	20,18
DRILL COLLAR	6,375	2,875	80,00	100,18
JAR	6,500	2,750	9,18	109,36
DRILL COLLAR	6,375	2,875	17,91	127,27
HW DRILL PIPE	5,000	3,000	83,49	210,76
DART SUB	6,250	3,000	0,80	211,56

BHA seq: 27 **BHA category:** Drilling **BHA description:** 8 1/2" rotary assy w/RAB tool
BHA no: 19

String component	OD in	ID in	Length m	Acc length m
BIT, PDC	8,500		0,28	0,28
RAB	8,500		3,33	3,61
VISION675	6,750		5,69	9,30
STAB STRING	8,500		1,47	10,77
MWD TOOL	6,750		8,43	19,20
ROLLER REAMER	8,500	2,250	2,04	21,24
DRILL COLLAR	6,375	2,875	80,00	101,24
JAR	6,500	2,750	9,18	110,42
DRILL COLLAR	6,375	2,875	17,91	128,33
HW DRILL PIPE	5,000	3,000	83,49	211,82
DART SUB	6,250	3,000	0,80	212,62

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BHA seq: 28 **BHA category:** Drilling **BHA description:** 8 1/2" rotary assy w/RAB tool

BHA no: 20

String component	OD in	ID in	Length m	Acc length m
BIT, PDC	8,500		0,28	0,28
RAB	8,500		3,33	3,61
VISION675	6,750		5,69	9,30
STAB STRING	8,500		1,47	10,77
MWD TOOL	6,750		8,43	19,20
ROLLER REAMER	8,500	2,250	2,04	21,24
XO SUB	6,500	2,250	0,99	22,23
BIT SUB W/FLOAT	6,375	2,940	0,74	22,97
DRILL COLLAR	6,375	2,875	80,00	102,97
JAR	6,500	2,750	9,18	112,15
DRILL COLLAR	6,375	2,875	17,91	130,06
HW DRILL PIPE	5,000	3,000	83,49	213,55
DART SUB	6,250	3,000	0,80	214,35

BHA seq: 29 **BHA category:** Drilling **BHA description:** Junk clean out assy w/junk basket

BHA no: 21

String component	OD in	ID in	Length m	Acc length m
ROCK BIT	8,500		0,23	0,23
JUNK BASKET	6,500	2,500	1,28	1,51
BIT SUB W/FLOAT	6,375	2,937	0,74	2,25
DRILL COLLAR	6,500	2,875	8,77	11,02
STAB STRING	8,500	2,750	1,80	12,82
DRILL COLLAR	6,500	2,875	26,13	38,95
ROLLER REAMER	8,500	2,250	2,04	40,99
DRILL COLLAR	6,500	2,875	53,82	94,81
JAR	6,500	2,750	9,18	103,99
DRILL COLLAR	6,500	2,875	17,91	121,90
HW DRILL PIPE	5,000	3,000	83,49	205,39
DART SUB	6,250	3,000	0,80	206,19

BHA seq: 30 **BHA category:** Drilling **BHA description:** 8 1/2" rotary assy w/RAB tool

BHA no: 22

String component	OD in	ID in	Length m	Acc length m
BIT, PDC	8,500		0,24	0,24
RAB	8,500		3,05	3,29
VISION675	6,750		5,69	8,98
STAB STRING	8,500		1,47	10,45
MWD TOOL	6,750		8,43	18,88
ROLLER REAMER	8,500	2,250	2,04	20,92
XO SUB	6,500	2,250	0,99	21,91
BIT SUB W/FLOAT	6,375	2,940	0,74	22,65
DRILL COLLAR	6,375	2,875	80,00	102,65
JAR	6,500	2,750	9,18	111,83
DRILL COLLAR	6,375	2,875	17,91	129,74
HW DRILL PIPE	5,000	3,000	83,49	213,23
DART SUB	6,250	3,000	0,80	214,03

BHA seq: 31 **BHA category:** Drilling **BHA description:** 8 1/2" rotary assy w/RAB tool

BHA no: 23

String component	OD in	ID in	Length m	Acc length m
BIT, PDC	8,500		0,24	0,24
RAB	8,250		3,05	3,29
VISION675	6,750		5,68	8,97
STAB STRING	8,500		1,50	10,47
MWD TOOL	6,750		8,42	18,89

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BHA seq: 31 **BHA category:** Drilling **BHA description:** 8 1/2" rotary assy w/RAB tool

BHA no: 23

String component	OD in	ID in	Length m	Acc length m
ROLLER REAMER	8,500	2,250	2,04	20,93
XO SUB	6,500	2,250	0,99	21,92
BIT SUB W/FLOAT	6,375	2,940	0,74	22,66
DRILL COLLAR	6,375	2,875	80,00	102,66
JAR	6,500	2,750	9,18	111,84
DRILL COLLAR	6,375	2,875	17,91	129,75
HW DRILL PIPE	5,000	3,000	83,49	213,24
DART SUB	6,250	3,000	0,80	214,04

BHA seq: 32 **BHA category:** Drilling **BHA description:** 8 1/2" rotary assy

BHA no: 24

String component	OD in	ID in	Length m	Acc length m
BIT, PDC	8,500		0,27	0,27
ROLLER REAMER, NB	8,500	2,750	1,86	2,13
VISION675	7,500		5,85	7,98
STAB STRING	8,500		1,50	9,48
MWD TOOL	6,875		8,44	17,92
ROLLER REAMER	8,500	2,250	1,72	19,64
XO SUB	6,500	2,250	0,99	20,63
BIT SUB W/FLOAT	6,375	2,940	0,74	21,37
DRILL COLLAR	6,375	2,875	80,00	101,37
JAR	6,500	2,750	9,18	110,55
DRILL COLLAR	6,375	2,875	17,91	128,46
HW DRILL PIPE	5,000	3,000	83,49	211,95
DART SUB	6,250	3,000	0,80	212,75

BHA seq: 33 **BHA category:** Drilling **BHA description:** 8 1/2" turbine assy

BHA no: 25

String component	OD in	ID in	Length m	Acc length m
BIT, DIAM/IMPREG	8,500		0,45	0,45
TURBINE	6,625		11,67	12,12
ROLLER REAMER	8,500	2,250	1,72	13,84
VISION675	7,500		5,85	19,69
STAB STRING	8,500		1,50	21,19
MWD TOOL	6,875		8,44	29,63
XO SUB	6,500	2,250	0,99	30,62
BIT SUB W/FLOAT	6,375	2,940	0,74	31,36
DRILL COLLAR	6,375	2,875	80,00	111,36
JAR	6,500	2,750	9,18	120,54
DRILL COLLAR	6,375	2,875	17,91	138,45
HW DRILL PIPE	5,000	3,000	83,49	221,94
DART SUB	6,250	3,000	0,80	222,74

BHA seq: 34 **BHA category:** Drilling **BHA description:** 8 1/2" rotary assy w/RAB tool

BHA no: 26

String component	OD in	ID in	Length m	Acc length m
BIT, PDC	8,500		0,33	0,33
RAB	8,375		3,09	3,42
CDR TOOL	6,750		6,43	9,85
STAB STRING	8,500		1,47	11,32
MWD TOOL	6,750		8,44	19,76
ROLLER REAMER	8,500	2,250	2,02	21,78
XO SUB	6,500	2,250	0,99	22,77
BIT SUB W/FLOAT	6,375	2,940	0,74	23,51
DRILL COLLAR	6,375	2,875	80,00	103,51

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BHA seq: 34 **BHA category:** Drilling **BHA description:** 8 1/2" rotary assy w/RAB tool
BHA no: 26

String component	OD in	ID in	Length m	Acc length m
JAR	6,500	2,750	9,45	112,96
DRILL COLLAR	6,375	2,875	17,91	130,87
HW DRILL PIPE	5,000	3,000	83,49	214,36
DART SUB	6,250	3,000	0,80	215,16

BHA seq: 35 **BHA category:** Drilling **BHA description:** Junk clean out assy w/junk basket
BHA no: 27

String component	OD in	ID in	Length m	Acc length m
ROCK BIT	8,500		0,25	0,25
JUNK BASKET	6,500	2,250	0,75	1,00
JUNK BASKET	6,500	2,250	1,27	2,27
BIT SUB W/FLOAT	6,438	2,812	0,84	3,11
DRILL COLLAR	6,500	2,875	9,07	12,18
STAB STRING	8,250	2,750	1,79	13,97
DRILL COLLAR	6,500	2,875	44,80	58,77
JAR	6,500	2,750	9,45	68,22
DRILL COLLAR	6,500	2,875	17,91	86,13
HW DRILL PIPE	5,000	3,000	83,49	169,62
DART SUB	6,250	3,000	0,80	170,42

BHA seq: 36 **BHA category:** Drilling **BHA description:** 8 1/2" rotary assy w/RAB tool
BHA no: 28

String component	OD in	ID in	Length m	Acc length m
BIT, PDC	8,500		0,33	0,33
RAB	8,375		3,09	3,42
CDR TOOL	6,750		6,43	9,85
STAB STRING	8,500		1,47	11,32
MWD TOOL	6,750		8,44	19,76
ROLLER REAMER	8,500	2,250	2,02	21,78
XO SUB	6,500	2,250	0,99	22,77
BIT SUB W/FLOAT	6,375	2,940	0,74	23,51
DRILL COLLAR	6,375	2,875	80,00	103,51
JAR	6,500	2,750	9,45	112,96
DRILL COLLAR	6,375	2,875	17,91	130,87
HW DRILL PIPE	5,000	3,000	83,49	214,36
DART SUB	6,250	3,000	0,80	215,16

BHA seq: 37 **BHA category:** Drilling **BHA description:** 8 1/2"coring assy no 1
BHA no: 29

String component	OD in	ID in	Length m	Acc length m
CORE HEAD	8,500		0,36	0,36
CORE BARREL	6,500		29,94	30,30
CROSSOVER TOOL	6,500	2,250	0,99	31,29
BIT SUB W/FLOAT	6,375	3,000	0,74	32,03
DRILL COLLAR	6,500	2,875	17,33	49,36
STAB STRING	8,375	2,750	1,75	51,11
DRILL COLLAR	6,500	2,750	62,67	113,78
JAR	6,500	2,750	9,45	123,23
DRILL COLLAR	6,500	2,875	17,91	141,14
HW DRILL PIPE	5,000	3,000	83,49	224,63
DART SUB	6,250	3,000	0,80	225,43

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BHA seq: 38 **BHA category:** Drilling **BHA description:** 7 7/8" fishing assy

BHA no: 30

String component	OD in	ID in	Length m	Acc length m
JUNK BASKET,REV.CIRC	7,875		1,21	1,21
CROSSOVER TOOL	6,500	2,250	0,99	2,20
BIT SUB W/FLOAT	6,375	3,000	0,74	2,94
DRILL COLLAR	6,500	2,875	17,33	20,27
STAB STRING	8,375	2,750	1,75	22,02
DRILL COLLAR	6,500	2,750	62,67	84,69
JAR	6,500	2,750	9,34	94,03
DRILL COLLAR	6,500	2,875	17,91	111,94
HW DRILL PIPE	5,000	3,000	83,49	195,43
DART SUB	6,250	3,000	0,80	196,23

BHA seq: 39 **BHA category:** Drilling **BHA description:** 8 1/2"coring assy no 2

BHA no: 31

String component	OD in	ID in	Length m	Acc length m
CORE HEAD	8,500		0,36	0,36
CORE BARREL	6,500		57,51	57,87
CROSSOVER TOOL	6,500	2,250	0,99	58,86
BIT SUB W/FLOAT	6,375	3,000	0,74	59,60
DRILL COLLAR	6,500	2,875	17,33	76,93
STAB STRING	8,375	2,750	1,75	78,68
DRILL COLLAR	6,500	2,750	62,67	141,35
JAR	6,500	2,750	9,45	150,80
DRILL COLLAR	6,500	2,875	17,91	168,71
HW DRILL PIPE	5,000	3,000	83,49	252,20
DART SUB	6,250	3,000	0,80	253,00

BHA seq: 40 **BHA category:** Drilling **BHA description:** Junk mill assy w/junk subs

BHA no: 32

String component	OD in	ID in	Length m	Acc length m
JUNK MILL	8,375		0,82	0,82
JUNK SUB	6,375	2,250	0,75	1,57
JUNK SUB	6,375	2,250	1,26	2,83
BIT SUB W/FLOAT	6,438	2,812	0,74	3,57
STAB STRING	8,375	2,875	1,79	5,36
DRILL COLLAR	6,500	2,875	17,33	22,69
STAB STRING	8,375	2,750	1,75	24,44
DRILL COLLAR	6,500	2,875	62,67	87,11
JAR	6,500	2,750	9,45	96,56
DRILL COLLAR	6,500	2,875	17,91	114,47
HW DRILL PIPE	5,000	3,000	83,49	197,96
DART SUB	6,250	3,000	0,80	198,76

BHA seq: 41 **BHA category:** Drilling **BHA description:** Weatherford jet pump assy

BHA no: 33

String component	OD in	ID in	Length m	Acc length m
PUMP BAILER			9,80	9,80
CIRC. SUB	6,500		0,94	10,74
XO SUB	6,500	2,250	0,99	11,73
BIT SUB W/FLOAT	6,375	3,000	0,74	12,47
STAB STRING	8,375	2,875	1,79	14,26
H W DRILL PIPE	5,000	3,000	55,27	69,53
JAR	6,375	2,750	9,59	79,12
HW DRILL PIPE	5,000	3,000	28,22	107,34
DART SUB	6,250	3,000	0,71	108,05

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BHA seq: 42 **BHA category:** Drilling **BHA description:** 8 1/2"coring assy no 3

BHA no: 34

String component	OD in	ID in	Length m	Acc length m
CORE HEAD	8,500		0,36	0,36
CORE BARREL	6,500		57,51	57,87
CROSSOVER TOOL	6,500	2,250	0,99	58,86
BIT SUB W/FLOAT	6,375	3,000	0,74	59,60
DRILL COLLAR	6,500	2,875	17,33	76,93
STAB STRING	8,375	2,750	1,79	78,72
DRILL COLLAR	6,500	2,750	62,67	141,39
JAR	6,500	2,750	9,45	150,84
DRILL COLLAR	6,500	2,875	17,91	168,75
HW DRILL PIPE	5,000	3,000	83,49	252,24
DART SUB	6,250	3,000	0,71	252,95

BHA seq: 43 **BHA category:** Drilling **BHA description:** 8 1/2" rotary assy w/RAB tool

BHA no: 35

String component	OD in	ID in	Length m	Acc length m
BIT, PDC	8,500		0,35	0,35
RAB	8,375		3,09	3,44
CDR TOOL	6,750		6,43	9,87
STAB STRING	8,500		1,47	11,34
MWD TOOL	6,750		8,44	19,78
ROLLER REAMER	8,500	2,250	2,02	21,80
XO SUB	6,500	2,250	0,99	22,79
BIT SUB W/FLOAT	6,375	2,940	0,74	23,53
DRILL COLLAR	6,375	2,875	80,00	103,53
JAR	6,500	2,750	9,45	112,98
DRILL COLLAR	6,375	2,875	17,91	130,89
HW DRILL PIPE	5,000	3,000	83,49	214,38
DART SUB	6,250	3,000	0,80	215,18

BHA seq: 44 **BHA category:** Drilling **BHA description:** 8 1/2" coring assy no 4, 90 ft

BHA no: 36

String component	OD in	ID in	Length m	Acc length m
CORE HEAD	8,500		0,36	0,36
CORE BARREL	6,500		29,94	30,30
CROSSOVER TOOL	6,500	2,250	0,99	31,29
BIT SUB W/FLOAT	6,375	3,000	0,74	32,03
DRILL COLLAR	6,500	2,875	17,33	49,36
STAB STRING	8,375	2,750	1,75	51,11
DRILL COLLAR	6,500	2,750	62,67	113,78
JAR	6,500	2,750	9,45	123,23
DRILL COLLAR	6,500	2,875	17,91	141,14
HW DRILL PIPE	5,000	3,000	83,49	224,63
DART SUB	6,250	3,000	0,80	225,43

BHA seq: 45 **BHA category:** Drilling **BHA description:** 8 1/2" rotary assy wo/RAB tool

BHA no: 37

String component	OD in	ID in	Length m	Acc length m
BIT, PDC	8,500		0,35	0,35
BIT SUB W/FLOAT	6,375	2,940	0,74	1,09
CDR TOOL	6,750		7,05	8,14
STAB STRING	8,500		1,47	9,61
MWD TOOL	6,750		8,44	18,05
ROLLER REAMER	8,500	2,250	2,02	20,07
DRILL COLLAR	6,375	2,875	80,00	100,07
JAR	6,500	2,750	9,45	109,52

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BHA seq: 45 **BHA category:** Drilling **BHA description:** 8 1/2" rotary assy wo/RAB tool
BHA no: 37

String component	OD in	ID in	Length m	Acc length m
DRILL COLLAR	6,375	2,875	17,91	127,43
HW DRILL PIPE	5,000	3,000	83,49	210,92
DART SUB	6,250	3,000	0,80	211,72

BHA seq: 46 **BHA category:** Drilling **BHA description:** 8 1/2" rotary assy w/SMWD tool
BHA no: 38

String component	OD in	ID in	Length m	Acc length m
BIT, PDC	8,500		0,33	0,33
BIT SUB W/FLOAT	6,375	2,940	0,74	1,07
CDR TOOL	6,750		7,05	8,12
STAB STRING	8,500		1,47	9,59
MWD TOOL	6,750		8,31	17,90
SMWD	6,875		7,49	25,39
ROLLER REAMER	8,500	2,250	1,68	27,07
DRILL COLLAR	6,375	2,875	80,00	107,07
JAR	6,500	2,750	9,45	116,52
DRILL COLLAR	6,375	2,875	17,91	134,43
HW DRILL PIPE	5,000	3,000	83,49	217,92
DART SUB	6,250	3,000	0,80	218,72

BHA seq: 47 **BHA category:** Drilling **BHA description:** Fishing assembly for logging tool
BHA no: 39

String component	OD in	ID in	Length m	Acc length m
OVERSHOT	6,125		0,92	0,92
HW DRILL PIPE	5,000	3,000	83,49	84,41
DRILL PIPE	5,000			84,41

BHA seq: 48 **BHA category:** Drilling **BHA description:** 8 1/2" rotary assy.
BHA no: 40

String component	OD in	ID in	Length m	Acc length m
BIT, PDC	8,500		0,26	0,26
BIT SUB W/FLOAT	6,375	2,940	0,84	1,10
CDR TOOL	6,750		7,05	8,15
STAB STRING	8,500		1,50	9,65
MWD TOOL	6,750		8,42	18,07
ROLLER REAMER	8,500	2,250	1,68	19,75
DRILL COLLAR	6,375	2,875	80,00	99,75
JAR	6,500	2,750	9,45	109,20
DRILL COLLAR	6,375	2,875	17,91	127,11
HW DRILL PIPE	5,000	3,000	83,49	210,60
DART SUB	6,250	3,000	0,80	211,40

BHA seq: 49 **BHA category:** Drilling **BHA description:** 3 1/2" Cement stinger
BHA no: 41

String component	OD in	ID in	Length m	Acc length m
PUCS-A	3,500	2,437	9,13	9,13
DP 3 1/2"	3,500	2,437	308,98	318,11
CROSSOVER TOOL	6,500	2,250	1,22	319,33

BHA seq: 50 **BHA category:** Drilling **BHA description:** 8 1/2" rotary assy.
BHA no: 42

String component	OD in	ID in	Length m	Acc length m
BIT	8,500		0,25	0,25
BIT SUB W/FLOAT	6,375	2,940	0,84	1,09
DRILL COLLAR	6,375	2,875	26,13	27,22

BHA report

Wellbore: 0015/03-007

BHA seq: 50 **BHA category:** Drilling **BHA description:** 8 1/2" rotary assy.
BHA no: 42

String component	OD in	ID in	Length m	Acc length m
STAB STRING	8,375	2,812	1,80	29,02
DRILL COLLAR	6,375	2,875	53,87	82,89
JAR	6,500	2,750	9,18	92,07
DRILL COLLAR	6,375	2,875	17,91	109,98
HW DRILL PIPE	5,000	3,000	83,49	193,47
DART SUB	6,250	3,000	0,80	194,27

BHA seq: 51 **BHA category:** Drilling **BHA description:** 9 7/8" csg cutting assy.
BHA no: 43

String component	OD in	ID in	Length m	Acc length m
BULL NOSE	7,875		1,10	1,10
CUTTER	8,125		1,26	2,36
CROSSOVER TOOL	7,625		0,52	2,88
PUP JOINT	5,000		1,50	4,38
DRILL PIPE	5,000	3,250	393,73	398,11
CROSSOVER TOOL	8,000	2,687	0,85	398,96
MARINE SWIVEL	13,750	2,250	2,08	401,04
CROSSOVER TOOL	7,750	2,250	0,51	401,55

BHA seq: 52 **BHA category:** Drilling **BHA description:** 13 3/8" csg cutting assy.
BHA no: 44

String component	OD in	ID in	Length m	Acc length m
BRUSH	11,062		0,70	0,70
EZSV	11,062		0,94	1,64
RUNNING TOOL	6,250		1,49	3,13
CROSSOVER TOOL	6,375		0,90	4,03
CUTTER	9,875		1,83	5,86
CROSSOVER TOOL	9,875		0,92	6,78
CROSSOVER TOOL	9,875		0,46	7,24
PUP JOINT	5,000		1,50	8,74
DRILL PIPE	5,000	3,250	287,60	296,34
PUP JOINT	5,000		2,00	298,34
CROSSOVER TOOL	8,000	2,687	0,85	299,19
MARINE SWIVEL	13,750	2,250	2,08	301,27
CROSSOVER TOOL	7,750	2,250	0,51	301,78

BHA seq: 53 **BHA category:** Drilling **BHA description:** 20" x 30" cutting assy w/MOST
BHA no: 45

String component	OD in	ID in	Length m	Acc length m
BULL NOSE	8,000	1,500	0,37	0,37
CASING CUTTER	12,000		1,57	1,94
SUB	10,000	3,500	0,39	2,33
STAB SLEEVE	17,500	3,500	1,48	3,81
MOST TOOL	37,240		2,45	6,26
SPACE OUT SUB	8,000	2,190	2,50	8,76
MARINE SWIVEL		2,250	1,72	10,48
SUB	7,938	2,813	2,13	12,61
DRILL COLLAR	8,000	3,000	53,34	65,95
XO SUB	8,000	3,000	1,05	67,00
HW DRILL PIPE	5,000	3,000	28,10	95,10

App C Directional data, survey listing

Units are in Metres unless otherwise specified
Coordinates are from Installation. MDs are from Rig. TVDs are from Rig.
Vertical Section is from 0,00N 0,00E on azimuth 63,67
Bottom hole location is 23,82 m from wellhead on azimuth 353,50deg
Wellpath calculation is by Minimum Curvature
Prepared by Baker Hughes INTEQ

Wellbore

Name	Created	Last Revised
15/3-7	30-Apr-2001	10-Oct-2001

Well

Name	Government ID	Last Revised
15/3-7		22-Mar-2001

Installation

Name	Easting	Northing	Coord System Name	North Alignment
15/3 EXPLORATION	428006,0000	6524004,0000	ED50-UTM-31N on EUROPEAN DATUM 1950 datum	Grid

Field

Name	Easting	Northing	Coord System Name	North Alignment
EXPLORATION ZONE 31	0,0000	0,0000	ED50-UTM-31N on EUROPEAN DATUM 1950 datum	Grid

Created By

Comments

Wellpath Report

MD[m]	Inc[deg]	Dir[deg]	TVD[m]	North[m]	East[m]	Dogleg [deg/30m]	Vertical Section[m]
128,00	0,00	0,00	128,00	0,00N	0,00E	0,00	0,00
185,39	0,56	353,75	185,39	0,28N	0,03W	0,29	0,10
222,69	0,58	135,27	222,69	0,33N	0,08E	0,87	0,22
238,65	1,06	143,87	238,65	0,15N	0,23E	0,93	0,27
272,01	1,15	130,85	272,00	0,32S	0,66E	0,24	0,45
301,45	1,26	129,95	301,43	0,72S	1,13E	0,11	0,70
330,36	1,28	129,79	330,34	1,13S	1,63E	0,02	0,95
360,89	1,29	133,03	360,86	1,58S	2,14E	0,07	1,21
389,90	1,19	136,85	389,86	2,03S	2,58E	0,13	1,42
417,10	1,12	138,36	417,06	2,43S	2,95E	0,08	1,57
446,58	1,06	140,45	446,53	2,86S	3,32E	0,07	1,71
475,34	1,03	139,79	475,29	3,26S	3,65E	0,03	1,83
504,08	0,91	128,13	504,02	3,60S	4,00E	0,24	1,99
534,72	0,97	131,88	534,66	3,92S	4,38E	0,08	2,19
591,75	0,93	132,54	591,68	4,56S	5,09E	0,02	2,54
618,47	0,88	137,67	618,40	4,85S	5,38E	0,11	2,67
704,92	1,15	138,24	704,83	5,99S	6,41E	0,09	3,09
794,10	0,45	212,35	794,01	6,96S	6,82E	0,37	3,03
821,73	0,13	148,77	821,64	7,07S	6,78E	0,44	2,94
851,19	0,65	19,67	851,10	6,95S	6,85E	0,75	3,06
875,63	1,10	19,17	875,53	6,59S	6,97E	0,55	3,33
879,45	1,02	16,58	879,35	6,53S	6,99E	0,73	3,37
907,99	1,00	24,02	907,89	6,05S	7,17E	0,14	3,74
914,65	0,86	22,33	914,55	5,96S	7,21E	0,64	3,82
966,65	0,87	356,49	966,54	5,20S	7,33E	0,22	4,27
1052,44	0,76	350,97	1052,32	3,99S	7,21E	0,05	4,69
1139,05	0,57	329,06	1138,93	3,05S	6,89E	0,11	4,83
1225,07	0,32	314,89	1224,94	2,52S	6,50E	0,09	4,71
1312,21	0,37	300,59	1312,08	2,20S	6,09E	0,03	4,48
1397,86	0,52	296,71	1397,73	1,89S	5,50E	0,05	4,10
1483,76	0,96	327,31	1483,62	1,10S	4,77E	0,20	3,78
1568,68	1,19	319,56	1568,53	0,17N	3,81E	0,10	3,49
1655,85	0,98	327,33	1655,68	1,48N	2,82E	0,09	3,19
1741,93	0,22	7,88	1741,76	2,27N	2,45E	0,29	3,20
1827,94	0,24	51,04	1827,77	2,54N	2,61E	0,06	3,47
1915,22	0,21	197,62	1915,05	2,50N	2,70E	0,15	3,53
2002,70	0,42	171,56	2002,52	2,04N	2,70E	0,09	3,32
2089,00	0,54	176,59	2088,82	1,32N	2,77E	0,04	3,07
2174,77	0,54	170,66	2174,59	0,51N	2,86E	0,02	2,79
2262,14	0,27	180,83	2261,95	0,10S	2,92E	0,10	2,58
2348,20	0,33	156,76	2348,01	0,53S	3,02E	0,05	2,47
2434,56	0,44	109,38	2434,37	0,87S	3,43E	0,11	2,69
2520,69	0,77	73,02	2520,50	0,81S	4,30E	0,17	3,49
2605,37	0,57	303,56	2605,18	0,41S	4,49E	0,43	3,84
2692,52	0,53	305,58	2692,32	0,07N	3,80E	0,02	3,44
2711,61	0,83	334,09	2711,41	0,24N	3,67E	0,70	3,39
2757,08	1,18	7,53	2756,87	1,00N	3,59E	0,44	3,66
2785,67	1,31	4,83	2785,46	1,62N	3,65E	0,15	3,99
2808,35	1,21	12,94	2808,13	2,11N	3,73E	0,27	4,28
2838,09	0,99	10,74	2837,86	2,67N	3,85E	0,23	4,63
2866,34	0,92	1,15	2866,11	3,14N	3,90E	0,19	4,88
2894,06	0,75	358,89	2893,83	3,54N	3,90E	0,19	5,06
2952,51	0,71	314,35	2952,27	4,17N	3,63E	0,28	5,11
2980,74	0,58	312,08	2980,50	4,39N	3,40E	0,14	5,00
3010,53	0,63	280,02	3010,29	4,52N	3,13E	0,34	4,81
3039,02	0,57	274,46	3038,78	4,56N	2,83E	0,09	4,56
3067,19	0,55	272,17	3066,95	4,58N	2,56E	0,03	4,32

All data is in Metres unless otherwise stated
Coordinates are from Installation MD's are from Rig and TVD's are from Rig
Vertical Section is from 0,00N 0,00E on azimuth 63,67 degrees
Bottom hole distance is 23,82 Metres on azimuth 353,50 degrees from Wellhead
Calculation method uses Minimum Curvature method
Prepared by Baker Hughes INTEQ

Wellpath Report

MD[m]	Inc[deg]	Dir[deg]	TVD[m]	North[m]	East[m]	Dogleg [deg/30m]	Vertical Section[m]
3154,45	0,29	307,37	3154,21	4,73N	1,96E	0,12	3,85
3211,95	0,22	317,94	3211,70	4,90N	1,77E	0,04	3,76
3240,42	0,35	335,68	3240,18	5,02N	1,70E	0,16	3,75
3327,70	0,96	41,00	3327,45	5,81N	2,07E	0,30	4,43
3356,55	0,89	53,47	3356,30	6,13N	2,41E	0,22	4,88
3385,94	0,77	60,36	3385,68	6,36N	2,76E	0,16	5,30
3410,00	0,69	40,61	3409,74	6,55N	3,00E	0,33	5,59
3440,43	0,69	38,70	3440,17	6,83N	3,23E	0,02	5,93
3470,81	0,43	29,23	3470,55	7,08N	3,40E	0,27	6,19
3499,00	0,59	42,39	3498,74	7,28N	3,55E	0,21	6,41
3528,82	0,41	35,30	3528,55	7,47N	3,72E	0,19	6,65
3556,59	0,47	38,53	3556,32	7,65N	3,85E	0,07	6,84
3586,41	0,53	41,08	3586,14	7,84N	4,01E	0,06	7,07
3614,56	0,54	20,23	3614,29	8,07N	4,14E	0,21	7,29
3644,42	0,39	18,15	3644,15	8,30N	4,22E	0,15	7,46
3665,94	0,37	40,19	3665,67	8,42N	4,29E	0,20	7,58
3694,77	0,57	29,51	3694,50	8,62N	4,42E	0,23	7,78
3705,03	0,32	45,18	3704,76	8,68N	4,47E	0,81	7,85
3735,43	0,29	31,35	3735,16	8,80N	4,57E	0,08	8,00
3764,57	0,40	66,27	3764,30	8,91N	4,70E	0,24	8,16
3773,67	0,57	69,46	3773,40	8,94N	4,77E	0,57	8,24
3802,26	0,67	85,56	3801,99	9,00N	5,07E	0,21	8,54
3830,41	0,60	88,49	3830,13	9,02N	5,38E	0,08	8,82
3844,36	0,61	90,19	3844,08	9,02N	5,53E	0,04	8,96
3886,88	0,61	101,38	3886,60	8,97N	5,98E	0,08	9,34
3900,92	0,65	108,51	3900,64	8,93N	6,13E	0,19	9,45
3914,84	0,56	109,30	3914,56	8,89N	6,26E	0,19	9,56
3941,00	0,65	118,85	3940,72	8,77N	6,52E	0,15	9,73
3956,79	0,64	130,78	3956,51	8,67N	6,66E	0,26	9,82
3968,47	0,59	126,76	3968,19	8,59N	6,76E	0,17	9,87
4054,39	0,89	163,58	4054,10	7,69N	7,30E	0,19	9,95
4082,85	0,77	160,24	4082,56	7,30N	7,43E	0,14	9,89
4097,48	0,82	179,40	4097,19	7,10N	7,46E	0,55	9,84
4153,30	0,93	240,39	4153,00	6,47N	7,07E	0,48	9,21
4223,04	1,66	263,58	4222,72	6,08N	5,58E	0,38	7,70
4246,90	1,50	282,82	4246,57	6,11N	4,93E	0,69	7,13
4292,92	2,26	309,34	4292,57	6,82N	3,64E	0,74	6,29
4318,07	2,66	320,47	4317,70	7,59N	2,88E	0,74	5,95
4374,12	2,91	315,17	4373,68	9,60N	1,05E	0,19	5,20
4460,05	2,25	312,01	4459,52	12,28N	1,74W	0,24	3,89
4509,92	2,29	318,10	4509,35	13,67N	3,13W	0,15	3,26
4575,10	2,31	324,87	4574,48	15,72N	4,75W	0,13	2,71
4649,90	2,38	335,34	4649,22	18,36N	6,27W	0,17	2,52
4704,47	2,02	13,98	4703,75	20,32N	6,51W	0,82	3,18
4745,38	2,87	40,10	4744,62	21,81N	5,68W	1,01	4,58
4805,33	2,87	70,53	4804,50	23,45N	3,29W	0,75	7,45
4818,00	2,87	70,53	4817,16	23,67N	2,70W	0,00	8,08

All data is in Metres unless otherwise stated
Coordinates are from Installation MD's are from Rig and TVD's are from Rig
Vertical Section is from 0,00N 0,00E on azimuth 63,67 degrees
Bottom hole distance is 23,82 Metres on azimuth 353,50 degrees from Wellhead
Calculation method uses Minimum Curvature method
Prepared by Baker Hughes INTEQ

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	128,00	128,00	0,00N	0,00E	189,00	189,00	0,31N	0,03W	15/3-7
26,000	189,00	189,00	0,31N	0,03W	945,00	944,89	5,52S	7,33E	15/3-7
17 1/2	945,00	944,89	5,52S	7,33E	2740,00	2739,80	0,68N	3,57E	15/3-7
12 1/4	2740,00	2739,80	0,68N	3,57E	3996,00	3995,72	8,38N	6,97E	15/3-7
8 1/2	3996,00	3995,72	8,38N	6,97E	4818,00	4817,16	23,67N	2,70W	15/3-7

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	128,00	128,00	0,00N	0,00E	187,80	187,80	0,30N	0,03W	15/3-7
20,000in Casing	128,00	128,00	0,00N	0,00E	940,00	939,89	5,60S	7,31E	15/3-7
13 3/8in Casing	128,00	128,00	0,00N	0,00E	2733,00	2732,80	0,56N	3,58E	15/3-7
9 5/8in Casing	128,00	128,00	0,00N	0,00E	3990,00	3989,72	8,44N	6,93E	15/3-7

All data is in Metres unless otherwise stated
Coordinates are from Installation MD's are from Rig and TVD's are from Rig
Vertical Section is from 0,00N 0,00E on azimuth 63,67 degrees
Bottom hole distance is 23,82 Metres on azimuth 353,50 degrees from Wellhead
Calculation method uses Minimum Curvature method
Prepared by Baker Hughes INTEQ

App D Contractor list

Service	Company
Casing running services	Weatherford Norge AS
Cementing	Halliburton AS
Coring	Security DBS
Directional drilling	Baker Hughes Norge AS
Drilling contractor	Smedvig Offshore AS
Electric logging	Schlumberger Offshore Services Ltd
Helicopter	Norsk Helikopter AS
Mud	M-I Drilling Fluids
Mud logging	Baker Hughes Norge AS
MWD	Schlumberger Offshore Services Ltd
Production testing	Schlumberger Offshore Services Ltd
Rig positioning	Racal Survey Norge AS
ROV	Subsea Norge AS
Site survey	Fugro Survey AS
Wellhead system	ABB Offshore Systems AS

App E Wellsite sample descriptions

STATOIL

WELLSITE SAMPLE DESCRIPTION

Country:	Norway	Area:	North Sea	Field:	Gudrun
Well no.:	15/3-7				
R.T.:	18 meters	Company:	Statoil ASA, Norsk Hydro ASA, TotalFinaElf, BP Amoco		
Hole size:	17 ½"	Geologist:	Peter Sergeant	Date:	06.05.01

Depth (m RT)	Lithology (%)	Lithological Description: Rock name, mod. lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed. structures, accessories, fossils, porosity, contamination		Remarks: Shows, cavings, mud additives, etc.
950	80	CMT		clay washed out
	20	SD:	clr - trnsl, occ off wh - pa gry opq, R gry, R pk, med - v crs, mod srt, ang - rndd	
	Tr	LS:	wh - off wh, crypto - v f xln, mod ind, brit, cln	
	Gd Tr		Foss Frags & Glauc	
	Tr		Pyr nods	
960	60	CMT		clay easily washed
	40	CLST:	med brnsh gry, v sft, mod calc, mod micromic, v slty, slily - mod aren, slily glauc, Tr microcarb	away
	Tr	SD:	a.a. & Foss Frags	
970	a.a.			
980	a.a.			
990	100	CLST:	med - med dk brnsh gry - olv gry, v sft - sft, mod calc, mod micromic, mod - v slty & aren, slily - occ mod glauc, Tr microcarb, Tr micropyr, grd I.P. arg/sdy Sltst	
1000	a.a.			
1010	a.a.			
1020	100	CLST	a.a., bcm slily - mod calc	
1030	80	CLST:	a.a.	
	20	SLTST:	med gry, sft, slily calc, mod arg, v aren, slily mic, slily - mod glauc, Tr carb	
1040	90	CLST:	a.a.	loc incr slt &
	10	SLTST:	a.a.	sd washed out
	Tr		Foss Frag	of cly
1050	70	CLST:	a.a.	No shows
	10	SLTST:	a.a.	
	20	SD:	lse, clr - trnsl, Tr off wh opq, Tr gn glauc cotg, f - med, wl srt, ang - rndd, tr lse glauc	
1070	90	CLST:	a.a., loc v glauc	
	10	SD:	a.a., incr lse Glauc	
1080	100	CLST:	a.a.	
	Tr	SD:	a.a. & Foss frags	
	R	DOL:	med grysh brn, pr ind, microxln, slily calc, v arg	
1090	90	CLST:	a.a., also bcm dk brnsh gry & slily aren & slily microcarb	
	10	SD:	a.a. w/ com lse Glauc	

WELLSITE SAMPLE DESCRIPTION

Country:	Norway	Area:	North Sea	Field:	Gudrun
Well no.:	15/3-7				
R.T.:	18 meters	Company:	Statoil ASA, Norsk Hydro ASA, TotalFinaElf, BP Amoco		
Hole size:	17 ½"	Geologist:	Peter Sergeant	Date:	06.05.01

Depth (m RT)	Lithology (%)	Lithological Description: Rock name, mod. lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed. structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
1100	100	CLST: med dk - dk brnsh gry, sft, slily - occ mod calc, mod - v slty, slily aren, slily - mod glauc, mod micromic, slily microcarb, also Tr med lt brnsh gry, frm, non calc, slily slty, slily micromic, slily aren, Tr glauc & pyr	No shows
	Tr	SD: a.a.	
	Tr	SST: wh, sft, v f - f, wl srt, ang - sbrndd, mod calc, slily glauc	
1120	100	CLST: a.a.	
1130	100	CLST: a.a.	
	Tr	SD: a.a.	
1140	100	CLST: a.a.	
	Tr	SD: a.a.	
1150	100	CLST: a.a., Tr foss frag	
	Tr	SD: a.a.	
1160	a.a.		
1170	100	CLST: med dk - dk brnsh gry, sft - occ slily frm, slily - mod calc, mod - v slty, slily - mod aren, mod - v micromic, slily - occ mod glauc, Tr micropyr & microcarb	
	Tr	SD: a.a.	
1180	100	CLST: a.a.	
1190	a.a.		
1200	a.a.		
1210	100	CLST: a.a., Tr - slily glauc	
1220	a.a.		
1230	100	CLST: a.a.	
	Tr	SLTST: med dk gry - occ med gnsh gry, sft, slily calc, v arg, slily aren, mod mic, slily - mod glauc, Tr micropyr	
1240	100	CLST: a.a., loc bcm v glauc	
	Tr	SLTST: a.a.	
1250	100	CLST: a.a.	
		Tr SLTST	
1260	100	CLST: med dk - dk brnsh gry - olv gry, sft - occ slily frm, Tr - slily calc, slily dol, mod micromic, mod - v slty, slily aren, Tr - slily glauc, Tr micropyr	
1270	100	CLST: a.a.	
1280	100	CLST: a.a., Tr bcm v glauc	

WELLSITE SAMPLE DESCRIPTION					Page 3 of 43
Country: Norway		Area: North Sea		Field: Gudrun	
Well no.: 15/3-7					
R.T.: 18 meters		Company: Statoil ASA, Norsk Hydro ASA, TotalFinaElf, BP Amoco			
Hole size: 17 ½"		Geologist: Peter Sergeant / Inger Winsvold		Date: 07.05.01	
Depth (m RT)	Lithology (%)	Lithological Description Rock name, mod. lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed. structures, accessories, fossils, porosity, contamination			Remarks Shows, cavings, mud additives, etc.

1290	100	CLST:	med dk - dk brnsh gry - olv gry ,Tr med - med dk gnsh gry, frm, mod calc, slily - mod slty, slily dol, slily micromic, slily glauc	No shows
	Tr	LS:	off wh - lt gnsh gry, hd, brit, microxln, slily dol, slily arg	
	Tr	DOL:	pa brn, hd, brit, microxln, slily - mod calc, slily - mod arg	
1300	100	CLST:	a.a.	
	Tr	LS/DOL:	a.a.	
1310	100	CLST:	med dk olv gry - occ brnsh gry, sft - slily frm, mod calc, slily dol, mod - v slty, tr - slily aren, mod micromic, slily glauc, Tr micropyr	
1320	100	CLST:	a.a.	
	R	DOL:	a.a.	
1330	100	CLST:	med dk - dk olv gry, sft - frm, v slily - occ mod calc, dom slily calc, slily dol, slily - v slty, Tr aren, slily - mod micromic, Tr glauc & micropyr	
1340	a.a.			
1350	a.a.			
1360	a.a.			
1370	100	CLST:	dom slily - mod slty	
1380	a.a.			
1390	100	CLST:	a.a.	
	Tr	DOL:	pa grysh brn - brnsh gry, pr - mod ind, micr, v calc, v arg, Tr microcarb, Tr glauc, grd Dol Mrl	
1400	90	CLST:	a.a.	
	10	DOL:	a.a.	
1410	100	CLST:	a.a.	
	Tr	DOL:	a.a.	
1420	100	CLST:	a.a., Tr - slily calc, slily - mod - occ v slty	
1430	100	CLST:	a.a., loc occ brnsh gry	
	Tr	DOL:	a.a.	
1440	100	CLST:	a.a.	
1450	100	CLST:	med dk grn - dk grnsh gry, blky, sft - frm, tr - slily calc, slily - mod slty, Tr micromic, Tr micropyr	
1460	100	CLST:	a.a., slily - mod - occ v slty	

WELLSITE SAMPLE DESCRIPTION					Page 4 of 43
Country: Norway		Area: North Sea		Field: Gudrun	
Well no.: 15/3-7					
R.T.: 18 meters		Company:	Statoil ASA, Norsk Hydro ASA, TotalFinaElf, BP Amoco		
Hole size: 17 ½"		Geologist:	Peter Sergeant / Inger Winsvold	Date:	08.05.01
Depth (m RT)	Lithology (%)	Lithological Description: Rock name, mod. lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed. structures, accessories, fossils, porosity, contamination			Remarks: Shows, cavings, mud additives, etc.

1470	90	CLST:	med dk grn - dk grnsh gry, loc olv blk, blky, sft - frm, tr - slily calc, slily - mod slty, Tr micromic, Tr micropyr	No shows
	10	SLST:	olv gry, gd srtd, frm - sft, arg, v calc, occ grad slty Clst	
1480	80	CLST:	a.a., med dk gry - dk grnsh gry, mod - v slty	
	20	SLST:	a.a. calc cmt	
	Tr	DOL:	pa grysh brn - brnsh gry, pr - mod ind, micr, v calc, v arg, Tr microcarb, Tr glauc, grd Dol Mrl	
1490	80	CLST:	med dk grn - dk grnsh gry, blky, sft - frm, tr - slily calc, mod -v slty, Tr micromic, Tr micropyr	
	20	SLST:	olv gry, occ med lt gry, wl srt, calc cmt, frm, arg, aren I.P., occ grad v f Sst	
	Tr	DOL:	a.a.	
	Tr	LS:	spkld, lt brn gry, yrl gry, sbrndd, v hd, microxln	
	Tr	SST:	lse, clr - dom trnsl - occ off wh opq, v f -f, wl srtd, ang - sbang, Tr lse Mic	
1500	100	SST:	clr - trnsl, v f - f, wl srtd, sbang - ang, lse, Tr micropyr, Tr Mic	

Samples 1500 - 1513 circulated out on 1st aborted fishing run

1510	90	SST:	clr - trnsl, f - med, occ crs, mod - wl srt, sbrnd - sbang, lse, Tr micropyr, Tr Mic, Tr Glauc
	10	SLST:	olv gry, wl srtd, sft, v calc, grad v f Sst, Tr micromic
	Tr	DOL:	wh - yel gry, blky, hc
1513	100	SST:	a.a.
	Tr	SLST:	a.a.
	Tr	CLST:	olv gry, occ gry blk, sbblky, sft - frm, slily calc

60 bar pressure loss noted. Bit & bottom of motor and shaft left in hole at 1513m

1520	80	SST:	lse, clr - occ trnsl, Tr or brn stn, Tr v f - dom f - Tr med crs, mod srt, sbang - rndd, Tr lse Glauc & Pyr , R Mic
	20	CLST:	med dk gry, sft - frm, non calc, slily - mod micromic, slily microcarb, Tr glauc, Tr micropyr
1523	50	SST:	lse, clr - trnsl, Tr off wh opq, R gry lith gr, v f - dom f - med - occ crs, pr srt, ang - sbrndd, Tr lse Mic & Glauc, Gd Tr pyr nods
	50	CLST:	med - med dk gry - olv gry, sft - frm, non - slily calc, non slty I.P., slily - v slty I.P., slily - mod micromic, Tr - occ slily glauc, Tr - slily microcarb, Tr micropyr
		Tr	LS: lt - med yelsh brn - grysh brn, hd, crp - microxln, slily dol, mod arg, Tr slty & sdy, Tr glauc & micropyr
1530	80	SST:	lse, clr - com trnsl, Tr off wh opq, Tr pa - med rd - or - or brn stn, f - med - occ crs, mod srt, ang - rndd, Tr - Gd Tr lse Glauc & Pyr, R - Tr lse Mic
	20	CLST:	a.a.
	Tr	LS:	a.a.
1540	a.a.		

WELLSITE SAMPLE DESCRIPTION

Country:	Norway	Area:	North Sea	Field:	Gudrun
Well no.:	15/3-7				
R.T.:	18 meters	Company:	Statoil ASA, Norsk Hydro ASA, TotalFinaElf, BP Amoco		
Hole size:	17 ½"	Geologist:	Peter Sergeant	Date:	12.05.01

Depth (m RT)	Lithology (%)	Lithological Description: Rock name, mod. lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed. structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
1550	50	SST: lse, clr - com trnsl, Tr off wh opq, Tr pa - med rd - or - or brn stn, f - med - occ crs, mod srt, ang - rndd, Tr - Gd Tr lse Glauc & Pyr, R - Tr lse Mic	No shows
	50	CLST: med - med dk gry - gnsh gry, sft - dom frm, fiss - sbblky, non calc, slily - mod micromic, slily microcarb, Tr glauc & micropyr, Tr bcm v slty/sdy, grd arg/slty v f SST	
	Tr	LS: spkld, lt brn gry, yrl gry, sbrndd, v hd, microxln	
1560	50	SST: a.a., bcm f - crs - Tr v crs, pr srt	ca. 10% CLST cvgs
	50	CLST: a.a.	at shakers
	Tr	LS: a.a.	
1570	40	SST: a.a.	
	60	CLST: a.a., Tr v slty/sdy lams grd arg/slty/Sst	
	Tr	LS: a.a.	
1580	60	SST: a.a.	
	40	CLST: a.a.	
	Tr	LS: a.a.	
1590	50	SST: a.a., f - v crs, v pr srt	
	50	CLST: a.a., also occ med dk - dk olv gry - brnsh gry, sft, non calc, v slty/sny, slily - mod micromic, Tr - occ slily glauc, Tr micropyr, slily - occ mod carb, grd arg/slty v f - f Sst	
1600	80	CLST: a.a., also Tr pa brn - gnsh brn, sft, slily calc, mod dol, Tr pyr	c. 40% CLST
	20	SST: a.a. Tr small sil Cmtd Sst frags	cvgs at shakers
1610	50	SST: lse, clr - trnsl - Tr off wh opq, Gd Tr pa rd - or - or brn stn, v f - v crs, v pr srt, ang - rndd, Tr lse Glauc & Pyr & Mic, Tr sil cmtd Sst frags & Tr evid clst clsts	
	50	CLST: a.a.	
1620	40	SST: a.a., Tr v f - dom f - med - occ crs - v crs	pump anti bit
	60	CLST: a.a.	balling pill
1625	90	SST: a.a., loc bcm v f - f - Tr med - v crs	mnr barite
	10	CLST: a.a.	contam
1628	50	SST: a.a., dom v f - f - occ med - v crs	Tr cvgs at
	50	CLST: a.a.	shakers
1630	100	SST: clr - trnsl, tr pa rd - or stn, v f - f, wl srt, ang - sbrndd, Tr lsr Mic & Glauc, R lse Pyr	
	Tr	CLST: a.a.	
1640	100	SST: a.a.	
	Tr	CLST: a.a.	

WELLSITE SAMPLE DESCRIPTION

Country:	Norway	Area:	North Sea	Field:	Gudrun
Well no.:	15/3-7				
R.T.:	18 meters	Company:	Statoil ASA, Norsk Hydro ASA, TotalFinaElf, BP Amoco		
Hole size:	17 ½"	Geologist:	Peter Sergeant / Nils Einar Aase	Date:	13.05.01

Depth (m RT)	Lithology (%)	Lithological Description: Rock name, mod. lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed. structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
1650	90	SST: clr - trnsl, tr pa rd - or stn, v f - f, wl srt, ang - sbrndd, Tr lsr Mic & Glauc, bcm v f - f - Tr med - crs, mod srt	No shows
	10	CLST: med - med dk gry - gnsh gry, also occ dk olv gry - brnsh gry, sft, fiss - sbblky, non calc, slily - mod micromic, slily microcarb, Tr - occ slily glauc, Tr micropyr, slily - occ mod carb, grd arg/slty v f - f Sst	
1660	40	SST: a.a., v f - f - occ med - v crs, v pr srt	
	60	CLST: med dk gry - gnsh gry - olv gry, Tr - occ grysh gn, occ dk olv gry, sft - frm, non calc, non - occ slily slty, slily - mod micromic, Tr - slily microcarb, Tr glauc & micropyr, Gd Tr bcm mod - v slty/sdt, grd arg/slty Sst	
1670	30	SST: a.a., v f - med - occ crs - v crs, v pr srt, Tr off wh - pa gry cln Rk Flour/Mtrx Tr lt gry, arg Rk Flour/Mtrx, Tr sil cmtd Sst frags	
	70	CLST: a.a.	
1680	30	SST: a.a., v f - dom f - med - occ crs - v crs	TR cvgs on shakers
	70	CLST: a.a.	
1690	50	SST: a.a., v f - dom f - occ med - Tr crs - v crs	
	50	CLST: a.a.	
1700	40	SST: a.a., v f - dom f - med - Tr crs - v crs	
	60	CLST: a.a.	
1710	50	SST: a.a., v f - dom f - med - R crs - v crs	
	50	CLST: a.a.,	
1720	80	SST: clr - occ trnsl, Tr off wh opq, Tr pa rd - or stn, v f - med,, R crs, mod srt, ang - sbrndd - Tr rnd, Tr lse Mic & Glauc	
	20	CLST: a.a.	
1730	90	SST: a.a.	
	10	CLST: a.a.	
1740	a.a.		
1750	70	SST: a.a., v f - med - occ crs, pr srt	
	30	CLST: a.a.	
1760	20	SST: a.a., v f - crs	
	80	CLST: med dk gry - slily gnsh gry - blsh gry, sft - frm, fiss - sbblky, non calc, slily - mod micromic, Tr pyr, tr microcarb	
1770	20	SST: a.a, vf - med, occ crs - v crs	
	80	CLST: a.a	
1780	10	SST: a.a.	
	90	CLST: a.a.	

WELLSITE SAMPLE DESCRIPTION					Page 7 of 43
Country: Norway		Area: North Sea		Field: Gudrun	
Well no.: 15/3-7					
R.T.: 18 meters		Company:	Statoil ASA, Norsk Hydro ASA, TotalFinaElf, BP Amoco		
Hole size: 17 ½"		Geologist:	Peter Sergeant / Nils Einar Aase	Date:	14.05.01

Depth (m RT)	Lithology (%)	Lithological Description: Rock name, mod. lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed. structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
1790	30	SST: vf - crs, tr v crs, pr srt, tr lse glauc + pyr	
	70	CLST: med dk gry - slily gnsh gry - blsh gry, sft - frm, fiss - sbblky, non calc, slily - mod micromic, Tr pyr, tr microcarb	
1800	20	SST: vf - crs, tr v crs, pr srt, tr glauc	
	80	CLST: a.a.	
1810	20	SST: vf - crs, mod srt	No shows
	80	CLST: a.a.	
1820	Lost sample		
1830	30	SST: clr - transl, occ mlky wh, occ rdsh stn, vf - med, occ crs, pr srt, ang - subrnd, tr glauc, tr micropyr,	
	70	CLST: med dk gry - grensh gry - blsh gry, sft - frm, non calc, fiss - sbblky, slily micromic - micromic, tr pyr, tr microcarb	
1840	20	SST: vf - f, occ med, tr crs, mod srt	
	80	CLST: a.a.	
1850	80	SST: f - med, occ vf - crs, med srt, tr glauc,	
	20	CLST: a.a.	
1860	40	SST: clr - transl, occ mlky wh, occ rdsh stn, vf - crs, pr srt, ang - subrnd, tr glauc, tr micropyr,	Decreasing amount of sand downwards
	60	CLST: med dk gry - min grensh gry, sft - frm, non calc, fiss - sbblky, slily micromic - micromic, tr pyr, tr microcarb	Sand is from the Grid sands above
1880	10	SST: a.a.	
	90	CLST: a.a.	
1890	80	CLST: med dk gry, sft - frm, non calc, fiss - sbblky, slily micromic - micromic, tr pyr, tr microcarb	
	10	LST: lt brn - brnsh gry, off wh, sft - hd, sblky - blky, microxln, slily arg, dolomitic	
	10	SST: a.a.	
1900	80	CLST: a.a.	
	10	LST: a.a.	
	10	SST: a.a.	
1910	90	CLST: a.a	
	10	SST: a.a	
	Tr	LST: a.a.	
1920	100	CLST: a.a.	
	Tr	LST: a.a.	
	Tr	SST: a.a.	
1930	100	CLST: a.a.	
	Tr	SST & LS: a.a.	

WELLSITE SAMPLE DESCRIPTION					Page 8 of 43
Country: Norway		Area: North Sea		Field: Gudrun	
Well no.: 15/3-7					
R.T.: 18 meters		Company:	Statoil ASA, Norsk Hydro ASA, TotalFinaElf, BP Amoco		
Hole size: 17 ½"		Geologist:	Peter Sergeant / Nils Einar Aase	Date:	14.05.01

Depth (m RT)	Lithology (%)	Lithological Description: Rock name, mod. lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed. structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
1940	100	CLST: med dk gry, sft - frm, non calc, fiss - sbblky, slily micromic - micromic, tr pyr, tr microcarb	
	Gd Tr	SST: wh, f - med , wl srt, ang - rndd, mod - wl cmtd w/ Calc, Tr - slily pyr, com as lse SD and dissaggregated Calc Cmt	
1950	100	CLST: med dk - dom dk gry - olv gry - occ olv blk, sft - frm, blky - sbfiss, non calc, slily micromic, Tr slt, Tr microcarb, Tr pyr, R - Tr glauc	
	Tr	SST: a.a.	
1960	100	CLST: a.a.	No shows
1970	100	CLST: a.a, Tr grysh brn - rdsh brn & slily - v glauc	
1980	100	CLST: a.a., bcm blky - sbfiss, occ washed out crs nods Glauc	<5% cvgs on shakers
1990	a.a.		
2000	a.a.		
2010	100	CLST: a.a., non - slily calc	
	Tr	LS: lt gry, dom med yelsh brn, mod - wl ind, microxln, slily dol, slily - mod arg, Tr micropyr & glauc	
2020	100	CLST: a.a., R blsh gry, dom med dk - dk gry	
	Tr	LS: a.a.	
2030	100	CLST: med dk - dk gry, sft - frm, fiss - sbblky, Tr - slily calc, Tr dol, mod micromic, Tr - slily slty, slily microcarb, Tr micropyr, R glauc	
2040	a.a.		
2050	a.a.		
2060	a.a.		
2070	100	CLST: a.a., med dk gry - occ olv gry, Tr gnsh gry - blsh gry	
	Tr	LS: a.a.	
2080	100	CLST: med dk - dk gry - occ olv gry, occ blsh gry, sft - frm, fiss - sbblky, non - dom slily calc, Tr dol, Tr - slily slty, slily - dom mod micromic, Tr pyr, R glauc	
	Tr	LS: a.a.	
2090	100	CLST: a.a., Tr dk grysh brn	
2100	100	CLST: a.a, R grysh brn	
	Tr	LS: a.a.	
2110	100	CLST: a.a., Tr grysh brn - brnsh gry, Tr gnsh gry, Tr Glauc nods	<5% cvgs on shakers
	Tr	LS: a.a.	

WELLSITE SAMPLE DESCRIPTION

Country:	Norway	Area:	North Sea	Field:	Gudrun
Well no.:	15/3-7				
R.T.:	18 meters	Company:	Statoil ASA, Norsk Hydro ASA, TotalFinaElf, BP Amoco		
Hole size:	17 ½"	Geologist:	Peter Sergeant / Nils Einar Aase	Date:	15.05.01

Depth (m RT)	Lithology (%)	Lithological Description: Rock name, mod. lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed. structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
2120	100	CLST: dom med k - dk gry - plv gry & blsh gry, Tr gnsh gry, Tr grysh brn - brnsh gry, sft - frm, fiss - sbblky, non - dom slily calc, Tr dol, Tr - slily slty, slily - dom mod micromic, Tr pyr, R glauc	
	Tr	LS: lt gry, dom med yelsh brn, mod - wl ind, microxln, slily dol, slily - mod arg, Tr micropyr & glauc	
2130	100	CLST: a.a, med dk gry - brnsh gry, olv gry, tr blsh grn - grysh bl grn, mod brn	
	Tr	LS: a.a.	
2140	Lost sample		
2150	100	CLST: a.a, grysh bl grn, mod brn, dk grnsh gry, tr blsh grn,	No shows
	Tr	LS: a.a.	
2160	a.a.		
2170	100	CLST: dom med dk gry - dk gry, else a.a.	
	Tr	LS: a.a	
2180	100	CLST: a.a.	
	Tr	LS: a.a	
2190	100	CLST: a.a.	
	Tr	LS: a.a	
2200	90	CLST: med dk gry - dk gry, brsh gry, grysh bl grn, sft - frm, fiss - sbblky, non - slily calc, tr dol, tr micropyr, tr micromic	
	10	LS: lt gry, yelsh brn, microxln, slily dol, slily - mod arg	
2210	50	CLST: a.a.	
	30	TF: lt gry, med lt gry, lt gnsh gry, spk, sft, slily slty - sdy, non - slily calc	
	10	Pyr	
	10	LS: a.a.	
	10	SST: lse, clr - trnsl, v f - f, wl srt	
2220	50	CLST: a.a., Tr micropyr	
	40	TF: a.a.	
	10	LS: a.a., slily slty	
2230	60	CLST: a.a.	
	30	TF: a.a., occ mod calc	
	10	LS: a.a.	
2240	90	CLST: med dk - dk gry - brnsh gry, sft - frm, fiss - sbblky, non calc, micromic, Tr micropyr, slily slty, Tr microcarb	
	10	TF: a.a.	
	Tr	LS: a.a.	
2250	100	CLST: a.a.	
	Tr	TF & LS: a.a.	

WELLSITE SAMPLE DESCRIPTION

Country:	Norway	Area:	North Sea	Field:	Gudrun
Well no.:	15/3-7				
R.T.:	18 meters	Company:	Statoil ASA, Norsk Hydro ASA, TotalFinaElf, BP Amoco		
Hole size:	17 ½"	Geologist:	Peter Sergeant / Nils Einar Aase	Date:	15.05.01

Depth (m RT)	Lithology (%)	Lithological Description: Rock name, mod. lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed. structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
2260	100	CLST: med dk - dk gry - brnsh gry, sft - frm, fiss - sbblky, non calc, micromic, Tr micropyr, slily slty, Tr microcarb	
	Tr	LS: lt gry, yelsh brn, microxln, slily dol, slily - mod arg, slily slty	
2270	50	CLST: a.a.	
	50	SST: lse, clr - trnsl, Tr of wh opq, Tr rd stn, f - med - Tr crs, wl srt, ang - dom sbang - rndd, R lse Mic & Pyr & Glauc, Tr Rk Flour/Mtrx, off wh - lt gry, cln - slily arg, Tr pyr & mic, Tr blk & dk or brn carb incls	
	Tr	LS: a.a.	
2280	90	CLST: med dk - dk gry, Tr brnsh gry, sft - frm, fiss - sbblky, non calc, mod micromic, non - slily slty, Tr - slily microcarb, Gd Tr bcm mod - v sdy grd arg, v f - med Sst	No shows
	10	SST: a.a.	
	Tr	LS: a.a.	
2290	70	CLST: a.a.	
	30	SST: a.a., clr - com trnsl, occ w/ Calc cotg, & occ dissaggregated Calc Cmt frags,	
	Tr	wh calc Rk Flour/Mtrx	
2300	80	CLST: a.a.	
	20	SST: a.a.	
2310	80	CLST: a.a., Tr lt - med brnsh gry & v dol, slily calc I.P.	
	20	SST: a.a., bcm f - crs - Tr v crs, pr srt	
	Tr	DOL: pa - lt yelsh brn, pr ind, micr, slily - mod calc, v arg, Tr styl, grd Dol Mrl	
2320	80	CLST: a.a., Tr gnsh gry	
	20	SST: a.a., v f - med - occ crs - v crs, v pr srt	
2330	50	CLST: a.a.	
	50	SST: a.a., loc incr Calc cotg & dissaggregated Calc, Gd Tr wh calc Rk Flour/Mtrx	
2340	20	CLST: med -dk gry, occ gnsh gry, sft - frm, sbfiss - sbblky, non calc, mod micromic, Tr microcarb & micropyr, Gd Tr bcm v sdy, grd arg Sst	No shows
	80	SST: lse, clr - dom trnsl, Tr pk & rd & pa or stn, f - med - occ crs, mod srt, ang - occ sbrndd, Tr lse Pyr, Gd Tr Rk Flour/Mtrx, off wh - pa gry & cln, Tr wh & calc	
2350	20	CLST: a.a., loc incr v sdy grd arg Sst	
	80	SST: a.a., v f - crs, pr srt	
2360	10	CLST: a.a.	No shows
	90	SST: a.a., dom f - med, occ v f - crs, mod srt	
2370	10	CLST: a.a.	
	90	SST: a.a., v f - crs, mod - pr srt	
2380	10	CLST: a.a.	No shows
	90	SST: a.a., dom f - med, occ v f - crs, mod srt	

WELLSITE SAMPLE DESCRIPTION					Page 11 of 43
Country: Norway		Area: North Sea		Field: Gudrun	
Well no.: 15/3-7					
R.T.: 18 meters		Company:	Statoil ASA, Norsk Hydro ASA, TotalFinaElf, BP Amoco		
Hole size: 17 ½"		Geologist:	Peter Sergeant / Nils Einar Aase	Date:	18.05.01

Depth (m RT)	Lithology (%)	Lithological Description: Rock name, mod. lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed. structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
2390	100	SST: lse, clr - dom trnsl, occ off wh, Tr pk & rd & pa or stn, vf - crs, pr srt, sub-ang - sbrndd, Tr lse Pyr, Tr Rk Flour/Mtrx, off wh - pa gry & cln, Tr wh & calc	
	Tr	CLST: med -dk gry, occ gnsh gry, sft - frm, sbfiss - sbblky, non calc, mod micromic, Tr microcarb & micropyr, Gd Tr bcm v sdy, loc incr v sdy grd arg Sst	
2400	80	SST: a.a., v f - crs, Gd Tr Rk Flour/Mtrx	
	20	CLST: a.a.	
2410	90	SST: a.a.	
	10	CLST: a.a., med dk gry, gnsh gry, mod gn	
2420	75	SST: a.a., Gd Tr Rk Flour/Mtrx, Tr Pyr, v f - crs, pr srt	
	25	CLST: a.a.	
2430	70	SST: a.a., v f - dom f - med - occ crs -v crs	
	30	CLST: a.a.	
2440	80	SST: lse, clr - dom trnsl, Gd Tr lt rd - or stn, v f - dom f - med - occ crs - v crs, v pr - pr srt, ang - sbrndd - Tr rndd, R lse Pyr & Mic, Gd Tr Rk Flour/Mtrx, off wh - pa gry - occ lt - med gry, dom cln, occ var arg, non calc, Tr - occ slily mic & pyr, R glauc	
	20	CLST: lt - med - occ dk gry - gnsh gry, sft - frm, fiss - sbblky, non calc, slily - occ mod micromic - micromic, Tr micropyr, Tr gn glauc pchs, Tr bcm slily - v sdy, grd arg Sst	
2450	80	SST: a.a., loc incr arg Rk Flour/mtrx	
	20	CLST: a.a., loc incr sdy, grd arg SST	
2460	90	SST: v f - f - occ med , wl srt	
	10	CLST: a.a.	
2470	80	SST: a.a., v f - dom f - occ med - Tr crs, mod srt	
	20	CLST: a.a.	
2480	100	SST: a.a. v f - dom f - med - Tr crs	
	Tr	CLST: a.a.	
2490	80	SST: a.a. v f - med - Tr crs, mod srt	
	20	CLST: a.a.	
2500	60	SST: Tr v f - dom f - med - Tr crs	
	40	CLST: occ mod - v slty/sdy	
2508	70	SST: v f - med - Tr crs, Tr incr in dissaggregayed Calc & calc Rk Flour/Mtrx	
	30	CLST: a.a., incr v slty/sdy, grd arg SST	
2509	70	SST: a.a. v f - dom f - med - Tr crs	
	30	CLST: a.a.	

WELLSITE SAMPLE DESCRIPTION

Country:	Norway	Area:	North Sea	Field:	Gudrun
Well no.:	15/3-7				
R.T.:	18 meters	Company:	Statoil ASA, Norsk Hydro ASA, TotalFinaElf, BP Amoco		
Hole size:	17 ½"	Geologist:	Anna Fawke / Jim Gilpin	Date:	18.05.01

Depth (m RT)	Lithology (%)	Lithological Description: Rock name, mod. lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed. structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
2510	90	SST: v f - dom f - med - Tr crs, Tr incr in dissaggregayed Calc & calc Rk Flour/Mtrx	
	10	CLST: lt - med - occ dk gry - gnsh gry, sft - frm, fiss - sbblky, non calc, slily - occ mod micromic - micromic, Tr micropyr, Tr gn glauc pchs, Tr bcm slily - v sdy, incr v slty/sdy, grd arg SST	
2520	70	SST: a.a. v f - dom f - med - Tr crs	
	30	CLST: med dk gry, grnsh gry, sft - frm, fiss - sbblky, occ slty/sdy, grad arg SST	
2530	60	SST: a.a. v f - crs, pr srt,	
	40	CLST: a.a.	
2540	75	SST: a.a. v f - crs, pr srt,	
	25	CLST: a.a.	
2547	Not representative due to washing of shakers, POOH		
2560	60	SST: clr - transl qtz, v f - crs, pred f-m, pr srt, ang-rndd, hd, calc cmt, pred lse also hd cmtd	No shows
	35	CLST: grysh gn, grysh olv gn, pl gn, med dk gry, gry blk,blky - fiss, hd, micromic, non calc	
	5	LS: wh-off wh, microxln	
	Tr	Pyr	
2570	50	SST: a.a.	a.a.
	45	CLST: i.p. v hd, else a.a.	
	5	LS: a.a.	
	Tr	Pyr	
2580	70	SST: clr-transl qtz, v f - m, pred f, mod srt, sbrndd, hd, calc cmt, calc ctgs, pred as lse qtz, no vis por	a.a.
	25	CLST: a.a., also pl gn, sft, blky, tr rd or brn, sft, blky, non calc	
	5	LS: a.a.	
	Tr	Pyr	
2590	80	SST: clr - transl qtz, occ opq, pred lse grns, v f - crs, pred f, mod wl srtd, sbrndd, hd, calc cmt	a.a.
	20	CLST: pl gn, grysh gn, gnsh blk, olv gry, also r dk ylsh or, sft - hd, pred hd, blky, non calc	
	Tr	Pyr, Glauc, Ls, a.a.	
2600	90	SST: a.a.	a.a.
	10	CLST: pred dk grnsh gry, else a.a.	
	Tr	Mica, Ls, Glauc, Pyr	
2610	60	SST: a.a.	a.a.
	35	CLST: dk gry, dk grnsh gry, lt gy, pl gry, pl gn, sft - frm, non calc, blky, also tr rd - or - brn, frm, blky	
	5	LS: wh - off wh, microxln	
	Gd Tr	Pyr	
	Tr	Glauc, Mica	

WELLSITE SAMPLE DESCRIPTION

Country:	Norway	Area:	North Sea	Field:	Gudrun
Well no.:	15/3-7				
R.T.:	18 meters	Company:	Statoil ASA, Norsk Hydro ASA, TotalFinaElf, BP Amoco		
Hole size:	17 ½"	Geologist:	Anna Fawke / Jim Gilpin	Date:	19.05.01

Depth (m RT)	Lithology (%)	Lithological Description: Rock name, mod. lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed. structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
2620	95	SST: clr - transl qtz, occ opq, pred v f - f, wl srtd, lse qtz grns, sbrndd, hd, calc cmt	No Shows
	5	CLST: dk gry, dk grnsh gry, lt gy, pl gry, pl gn, sft - frm, non calc, blky, also tr rd - or - brn, frm, blky	
	Tr	Pyr, Glauc, Ls	
2630	90	SST: lse qtz, pred clr, occ mlky, yell/org, pnksh, vf - m, occ cse, gen f-m, pr srtd, gen sbang - sbrnd, occ ang & rnd, mod - pr sphericity, tr calc cmt, tr pyr	a.a
	10	CLST: dk gry dk grnsh gry, occ dk brnsh gry & bluish gry, frm, sb blky, non calc	
2640	95	SST: a.a. but f-cse, occ v cse & vf, pr srtd, tr calc cmt & wh calc rck flour/matrx mat.	a.a
	5	CLST: a.a.	
	Tr	Pyr	
2646	90	SST: lse qtz, clr, mlky, occ pa yell/org, pnksh, vf - cse, pr srtd, gen sbang - sbrnd, occ ang - v v rnd, pr - gd sph IP, fairly abd wh, lt gry, calc rck flr/mtrx material, R spicular foss frag	No shows
	10	CLST: med gry, dk gry, grnsh gry, frm, occ mod hd, sb splnt - sb blky, non calc	
	Tr	LS: tan, hd, ang, micxln - micr	
	Tr	Pyr, Mica	
2660	95	SST: a.a., ang - sbrnd, occ rnd, more calc Rck Flour/mtrx material, tr mica, else a.a.	a.a.
	5	CLST: a.a.	
	Tr	Pyr, Mica	
2670	95	SST: also pl ylsh or - dk ylsh brwn, else a.a.	a.a.
	5	CLST: a.a.	
	Tr	Pyr, Mica	
2680	90	SST: a.a.	a.a.
	10	CLST: a.a.	
	Tr	Pyr, Mica	
2690	40	SST: clr - transl qtz, v f - crs, pr srt, sbrndd, hd, calc cmt, pred lse	a.a.
	50	LS/MRL: pl gry - lt gry, m gy, microxln, v arg	
	10	CLST: grysh bl gn, pl gn, hd, blky, non calc, tr rd brn i.p.	
	Tr	Pyr, Mic	
2700	70	MRL: m dk gy - m gy, sft - frm, amor - sb blky, v arg	a.a
	20	SST: clr - transl qtz, v f - crs, pr srt, sbang - sbrndd, hd, calc cmt	
	10	CLST: a.a.	
	Tr	Pyr	
2710	25	SST: a.a., occ calc cmtd frags, ang - sb rnd	a.a
	70	MRL: v pa gry - off wh, m gry, occ m dk gry, sft - occ frm, sb blky - amor, occ dk gry / carb microlaminae (softens in water), 1x rnd pear shaped dk gry /opq foram?	
	5	CLST: a.a.	
	Tr	Pyr nod	
	R Tr	Glauc	

WELLSITE SAMPLE DESCRIPTION					Page 14 of 43
Country: Norway		Area: North Sea		Field: Gudrun	
Well no.: 15/3-7					
R.T.: 18 meters		Company:	Statoil ASA, Norsk Hydro ASA, TotalFinaElf, BP Amoco		
Hole size: 17 ½"		Geologist:	Anna Fawke / Jim Gilpin	Date:	19.05.01

Depth (m RT)	Lithology (%)	Lithological Description: Rock name, mod. lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed. structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
2720	35	SST: clr - transl qtz, f - m, i.p. vf - crs, mod - gen pr srtd, ang – rnd, hd, calc cmt	No Shows
	60	MRL: v pa gry - off wh, m gry, occ m dk gry, sft - occ mod hd, sb blky - amor, occ dk gry / carb microlaminae, grad to arg ls/chalk i.p.	
	5	LS: wh, off wh, v pa gry, ang, hd - mod hd, crmb - sub brit, chalky, sl arg i.p.	
	Tr	CLST: grysh bl gn, pl gn, hd, blky, non calc, tr rd brn i.p.	
	Tr	Pyr, nod	
2730	40	SST: a.a., sbang - rnd, pred f - m	a.a
	55	MRL: v pa gry, off wh, lt gry, pa pnk, pa grnsh gry IP, sft - occ frm, r mod hd, amor - sb blky, occ ang, r grad to arg ls	
	5	LS: a.a.	
	Tr	CLST: a.a.	
2735	30	SST: predom clr, vf - cse, pr srtd, gen sbang - sbrnd, mod sph, else a.a.	a.a
	65	MRL: grysh red - pa redish brn, v pa gry - lt gry, off wh, occ med gry, sft, occ frm, amor - sbblky	
	5	LS: colour a.a., ang - blky, hd, brit, miclxn - chlky	
2740	Lost sample		

TD FOR 17 1/2" SECTION

WELLSITE SAMPLE DESCRIPTION

Country:	Norway	Area:	North Sea	Field:	Gudrun
Well no.:	15/3-7				
R.T.:	18 meters	Company:	Statoil ASA, Norsk Hydro ASA, TotalFinaElf, BP Amoco		
Hole size:	12 ¼"	Geologist:	Tor Finn Kristensen / Jim Gilpin / Tor Kristian Hals	Date:	24 - 31.05.01

Depth (m RT)	Lithology (%)	Lithological Description: Rock name, mod. lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed. structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
2743	65	MRL: off wh, v pa gry, lt gy, pnksh, pnksh gry, grysh rd, occ sl med gry, sft-frm, amor-sbsplin (pdc), hydrofiss., tr nod pyr	No shows
	30	CLST: dk - med gry, dk olv gry, blsh gry, brnsh gry, blky , ang,, mod hd, micropyr, micromic, non calc, cavings	spot sample
	5	LS: off wh, pa gry-r yel brn, mod hd-hd, ang, micr-chlky	
2750	100	MRL: lt - mod blsh gry, lt gry, grysh rd-purp, occ rdsh brn, sft, amor-sbblky	No shows
2760	100	MRL: med gry-med dk gry, occ lt gry, occ grysh rd-purp, frm, md hd, ang-sbsplin, else a.a.	Colour Change*
2770	95	MRL: dk gry, med dk gry, med gry, v frm- mod hd, ang, sbsplin (pdc), grad to arg LS, else a.a.	
	5	LS: off wh, occ gry, mod hd, blky, chlky-micr.	
2777	60	MRL: a.a., grad to arg LS I.P.	No shows
	40	LS: off wh, crm, olv gry, mod hd-hd, brit, cryptoxln, chalky - sl arg I.P., gen v clean.	
2780	50	MRL: med dk gry, med gry, dk gry, occ olv gry, sft - occ frm, amor-sbsplin (pdc), blky-sbblky, else a.a.	a.a.
	50	LS: a.a., also occ med gry & arg grad to MRL	
	Tr	SD: f - crs, r calc cmt, contam from TY Fm. from casing gap?	
	RTr	Pyr nod, brown biotite.	
	Tr	CLST?: blky - v dk gry, hd, micromic/micropyr?, v carb, splin, ang, sbblky	
2790	30	MRL: pred med gry, sft, r frm, amor, else a.a.	a.a
	70	LS: pred off wh - crm, occ v pa gry, olv gry, v frm-hd, brit - crmb, chlky, occ thin arg / carb lam, loc tr dissem micropyr.	
2800	20	MRL: gen a.a. , also occ mod hd grad to arg LS.	a.a
	80	LS: predom a.a , occ med gry, also off wh - crm, v hd, blky, ang, smooth, crptoxln - microxln	
2810	50	MRL: med gry-pa gry, med dk gry, olv gry I.P., sft - v frm, occ mod hd, ang - sbblky, amor I.P., grad to arg LS I.P.	a.a More Argil.
	50	LS: med lt gry, med gry, - occ med dk gry, occ off wh - crm, v frm - mod hd, occ hd - r v hd, ang, blky, arg, occ chlky, grad to marl I.P., gen micr, occ crytoxln - micxln, tr loc dissem pyr	
2820	55	MRL: a.a.	
	45	LS: a.a., occ v lt gry, frm-hd	a.a
2830	60	MRL: med gry - med dk gry, olv gry, occ med lt gry, sft - frm, amor, grad arg LS I.P.	No shows
	40	LS: wh - v lt gry - yel gry - pk gry, occ med lt gry - med gry, frm - mod hd, pred micr, tr microxln, I.P. slily arg - arg	
2840	60	MRL: a.a.	a.a.
	40	LS: a.a.	

WELLSITE SAMPLE DESCRIPTION

Country:	Norway	Area:	North Sea	Field:	Gudrun
Well no.:	15/3-7				
R.T.:	18 meters	Company:	Statoil ASA, Norsk Hydro ASA, TotalFinaElf, BP Amoco		
Hole size:	12 ¼"	Geologist:	Lars Rasmussen / Tor Finn Kristensen	Date:	31.05. – 01.06.01

Depth (m RT)	Lithology (%)	Lithological Description: Rock name, mod. lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed. structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
2850	80	LS: wh - v lt gry - yel gry, frm - mod hd, pred micr, occ slily arg	No shows
	20	MRL: med gry - med dk gry, occ med lt gry, sft - frm, amor, grdg v arg LS i.p.	
2860	60	MRL: med gry - med dk gry, olv gry, med lt gry, sft - frm, occ mod hd, pred amor, occ blky, grad v arg LS I.P.	a.a.
	40	LS: occ med lt gry, else a.a.	
2870	70	LS: wh - v lt gry - yel gry, med lt gry - med dk gry, frm - mod hd, occ hd, blky, pred micr, occ microxln, I.P. slily arg - v arg, occ grad MRL	a.a.
	30	MRL: med lt gry - med gry, sft - frm, occ mod hd, grad arg LS I.P.	
2880	90	LS: pred wh - v lt gry - yel gry, occ med lt gry - med dk gry else a.a.	a.a.
	10	MRL: a.a.	
2890	60	MRL: a.a.	a.a.
	40	LS: a.a.	
2900	80	MRL: a.a.	a.a.
	20	LS a.a.	
2910	90	MRL: a.a.	a.a.
	10	LS: a.a.	
2920	70	MRL: r tr olv gry, else a.a.	a.a.
	30	LS: a.a.	
2930	60	MRL: occ olv gry, else a.a.	a.a.
	40	LS: occ lt gn gry, else a.a.	
2940	70	MRL: med lt gry-med gry, frm-mod hd, occ sft, else a.a.	a.a.
	30	LS: wh-v lt gry-yel gry, occ med lt gry-med dk gry, else a.a.	
2950	80	MRL: a.a.	a.a.
	20	LS: a.a.	
2960	80	MRL: med lt gry - med gry - med dk gry, frm - mod hd, occ sft, grdg arg LS i.p., occ slily micropyr	a.a.
	20	LS: wh - v lt gry - yel gry, occ med lt gry - med gry, frm - mod hd, occ hd, pred micr, tr microxln, slily arg - arg i.p.	
2970	80	MRL: a.a.	a.a.
	20	LS: a.a.	
2980	90	MRL: med lt gry - med gry, occ med dk gry, sft - frm, amor - occ blky, micropyr i.p., grdg arg LS i.p.	a.a.
	10	LS: a.a.	
2990	90	MRL: a.a.	a.a.
	10	LS: a.a.	

WELLSITE SAMPLE DESCRIPTION

Country:	Norway	Area:	North Sea	Field:	Gudrun
Well no.:	15/3-7				
R.T.:	18 meters	Company:	Statoil ASA, Norsk Hydro ASA, TotalFinaElf, BP Amoco		
Hole size:	12 ¼"	Geologist:	Lars Rasmussen / Tor Finn Kristensen	Date:	01.06. – 02.06.01

Depth (m RT)	Lithology (%)	Lithological Description: Rock name, mod. lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed. structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
3000	90	MRL: med lt gry - med gry, occ med dk gry, sft - frm, amor - occ blky, micropyr i.p., grdg arg LS i.p.	No shows
	10	LS: wh - v lt gry - yel gry, occ med lt gry - med gry, frm - mod hd, occ hd, pred micr, tr microxln, slily arg - arg i.p.	
3010	80	MRL: a.a.	a.a.
	20	LS: wh - v lt gry - yel gry, frm - mod hd, micr	
3020	95	MRL: a.a.	a.a.
	5	LS: a.a.	
3030	95	MRL: a.a.	a.a.
	5	LS: a.a.	
3040	95	MRL: a.a.	a.a.
	5	LS: a.a.	
3050	95	MRL: a.a.	a.a.
	5	LS: a.a.	
3060	70	MRL: a.a.	a.a.
	30	LS: wh - lt gry - med lt gry, frm - mod hd, pred micr, tr microxln, slily arg - arg i.p.	
3070	100	MRL: v lt gry - med lt gry, sft, amor, occ micropyr, grad arg LS I.P.	a.a.
	Tr	LS: a.a.	
	Tr	Sst: lt olv gry, clr - trnsl qtz, v f - f, sbang - sbrndd, hd, calc cmt, no vis por	
3080	100	MRL: v lt gry-med lt gry, sft, also gry brn-pa brn, sft-frm, else a.a.	a.a.
	Tr	LS: a.a.	
	Tr	PYR	
3090	100	MRL: sft-frm, amor-sbblky, else a.a.	a.a.
	Tr	LS: a.a.	
3100	100	MRL: v lt gry-med lt gry, lt olv gry, gry brn-pa brn, else a.a.	a.a.
	Tr	LS: a.a.	
3110	a.a.		a.a.
3120	a.a.		a.a.
3130	100	MRL: predom olv gry-dk gn gry, med lt gry-med gry, gry brn-pa brn, frm-occ mod hd, amor-sbblky, grad arg LS I.P.	a.a.
3140	100	MRL: gn gry - dk gn gry, med lt gry - med gry, gry brn, frm - occ mod hd, amor - sbblky, occ micropyr, grdg arg LS i.p.	a.a.
3150	100	MRL: a.a.	a.a.

WELLSITE SAMPLE DESCRIPTION

Country:	Norway	Area:	North Sea	Field:	Gudrun
Well no.:	15/3-7				
R.T.:	18 meters	Company:	Statoil ASA, Norsk Hydro ASA, TotalFinaElf, BP Amoco		
Hole size:	12 ¼"	Geologist:	Lars Rasmussen / Tor Finn Kristensen	Date:	02.06. – 03.06.01

Depth (m RT)	Lithology (%)	Lithological Description: Rock name, mod. lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed. structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
3160	100	MRL: pred med lt gry - med gry, gn gry - dk gn gry, gry brn, sft - frm, occ mod hd, amor - sbblky, occ micropyr, occ grdg arg LS	No shows
	Tr	LS: lt gry - pk gry, frm - mod hd, micr, slily arg	
3170	100	MRL: lt gry - med gry, sft - frm, amor - occ sbblky	a.a.
3180	100	MRL: a.a.	a.a.
3190	100	MRL: a.a.	a.a.
3200	100	MRL: occ gn gry, else a.a.	a.a.
3210	a.a.		occ yel wh min fluor
3220	100	MRL: lt gry - med dk gry, gn gry, else a.a.	a.a.
	Tr	Ls: a.a.	
3230	100	MRL: med gry - med dk gry, occ lt gry, occ gn gry, else a.a.	a.a.
3240	a.a.		a.a.
3250	100	MRL: a.a.	No shows
	Tr	LS: lt gry - yel gry, else a.a.	
3260	a.a.		a.a.
3270	100	MRL: med gry - med dk gry, occ pa brn - brn gry, occ lt gry - gn gry, else a.a.	a.a.
3280	a.a.		a.a.
3290	a.a.		a.a.
3300	100	MRL: med gry - med dk gry, occ lt gry - gn gry, else a.a.	a.a.
3310	a.a.		a.a.
3320	a.a.		a.a.
3330	100	MRL: a.a.	a.a.
	Gd tr	LS: lt gry - med lt gry, frm - mod hd, micr, slily arg	
3340	60	MRL: v lt gry - med gry, occ med dk gry, occ dk gn gry, sft - occ frm, amor, occ grdg arg LS	a.a.
	40	LS: v lt gry - lt gry - yel gry, frm - mod hd, blky, micr, chky text, slily arg	
3350	70	MRL: a.a.	a.a.
	30	LS: a.a.	
3360	70	MRL: a.a.	a.a.
	30	LS: a.a.	

WELLSITE SAMPLE DESCRIPTION

Country:	Norway	Area:	North Sea	Field:	Gudrun
Well no.:	15/3-7				
R.T.:	18 meters	Company:	Statoil ASA, Norsk Hydro ASA, TotalFinaElf, BP Amoco		
Hole size:	12 ¼"	Geologist:	Lars Rasmussen / Tor Finn Kristensen	Date:	03.06. – 04.06.01

Depth (m RT)	Lithology (%)	Lithological Description: Rock name, mod. lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed. structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
3370	60 MRL: 40 LS:	lt gry - med gry, occ med dk gry, sft - frm, amor v lt gry - lt gry - yel gry, occ med lt gry, frm - mod hd, blky, micr, chky tex, slily arg - occ arg	No shows
3380	50 MRL: 50 LS:	occ gry rd - mod brn, else a.a. v lt gry - lt gry - yel gry, gn gry, occ med lt gry, else a.a.	a.a.
3390	50 MRL: 50 LS:	a.a. a.a.	a.a.
3400	70 LS: 30 MRL:	v lt gry - lt gry - med lt gry, occ gn gry, frm - mod hd, blky, micr, chky tex, slily arg - occ arg med lt gry - med gry, occ med dk gry, frm, occ mod hd, amor - blky, I.P. grad arg LS	a.a.
3410	80 LS: 20 MRL:	a.a. a.a.	a.a.
3420	80 LS: 20 MRL:	a.a. occ pa brn - brn gry, else a.a.	a.a.
3430	90 LS: 10 MRL:	occ microglauc, else a.a. a.a.	a.a.
3440	95 LS: 5 MRL:	a.a. a.a.	a.a.
3450	90 LS: 10 MRL:	lt olv gry, microglauc, else a.a. a.a.	a.a.
3460	95 LS: 5 MRL:	a.a. a.a.	a.a.
3470	80 LS: 20 MRL:	a.a. a.a.	a.a.
3480	90 LS: 10 MRL:	a.a. frm - mod hd, else a.a.	a.a.
3490	100 LS: Tr MRL:	v lt gry - med lt gry - lt olv gry, occ gn gry, frm - mod hd, blky, micr, chky tex, slily arg - occ arg, slily microglauc i.p. a.a.	a.a.
3500	100 LS: Tr MRL:	a.a. a.a.	a.a.
3510	100 LS: Tr MRL:	a.a. a.a.	a.a.

WELLSITE SAMPLE DESCRIPTION

Country:	Norway	Area:	North Sea	Field:	Gudrun
Well no.:	15/3-7				
R.T.:	18 meters	Company:	Statoil ASA, Norsk Hydro ASA, TotalFinaElf, BP Amoco		
Hole size:	12 ¼"	Geologist:	Lars Rasmussen / Tor Finn Kristensen	Date:	04.06. – 06.06.01

Depth (m RT)	Lithology (%)	Lithological Description: Rock name, mod. lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed. structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
3520	100 LS:	v lt gry - med lt gry - olv gry, occ med gry, occ gn gry, frm - mod hd, blky, micr, chky tex, slily arg - occ arg, microglauc i.p.	No shows
3530	100 LS:	a.a.	a.a.
3540	100 LS:	a.a.	a.a.
3550	100 LS:	a.a.	a.a.
3560	100 LS:	a.a.	a.a.
3570	100 LS:	a.a.	a.a.
3580	95 LS: 5 MRL:	a.a. med gry - med dk gry, frm - mod hd, blky, I.P. grad arg LS	a.a.
3590	a.a.		a.a.
3600	95 MRL: 5 LS:	lt olv gry, gn gry - dk gn gry, sft, amor, glauc, arg grad arg LS I.P. a.a.	a.a.
3610	80 MRL: 20 LS:	med gry - med dk gry, lt olv gry, gn gry - dk gn gry, sft - frm, else a.a. a.a.	a.a.
3620	80 MRL: 20 LS:	a.a. a.a.	a.a.
3630	a.a.		a.a.
3640	90 MRL: 10 LS:	a.a. a.a.	a.a.
3650	a.a.		a.a.
3660	100 MRL: Tr LS:	glauc - v glauc I.P., else a.a. glauc - v glauc I.P., else a.a.	a.a.
3670	a.a.		a.a.
3680	60 MRL: 40 LS:	med gry - med dk gry, sft - frm, amor - sbblky, i.p. grdg arg ls lt gry - med lt gry, occ v lt gry, frm - occ sft, amor - sbblky, micr, microglauc i.p., slily arg - occ arg, grdg mrl	a.a
3690	60 MRL: 40 LS: Gd Tr CLST:	a.a occ mod hd, else a.a dk gry - grysh blk, sft - frm, amor, slily calc, micropyr i.p.	a.a

WELLSITE SAMPLE DESCRIPTION

Country:	Norway	Area:	North Sea	Field:	Gudrun
Well no.:	15/3-7				
R.T.:	18 meters	Company:	Statoil ASA, Norsk Hydro ASA, TotalFinaElf, BP Amoco		
Hole size:	12 ¼"	Geologist:	Lars Rasmussen / Tor-Arild W Johnsen	Date:	07.06. – 11.06.01

Depth (m RT)	Lithology (%)	Lithological Description: Rock name, mod. lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed. structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
3700	70	MRL: med gry - med dk gry, sft - frm, amor - sbblky, i.p. grdg arg ls, also gryish brn - mod brn, sft, blky - amor	No shows
	25	LS: lt gry - med lt gry, occ v lt gry, frm - occ sft, amor - sbblky, micr, microglauc i.p., slily arg - occ arg, grdg mrl	
	5	CLST: dk gry - grysh blk, sft - frm, amor, slily calc, micropyr i.p.	
3710	70	MRL: a.a.	a.a.
	30	LS: a.a.	
	Tr	CLST: a.a.	
3720	80	MRL: a.a.	a.a.
	20	LS: a.a.	
	Tr	CLST: a.a.	
3730	90	MRL: frm - mod hd, occ sft, else a.a	a.a
	10	LS: off wh - v lt gry, frm, amor - blky, frm, micr, slily arg - arg	
3740	100	MRL: a.a	a.a
3750	100	MRL: microglauc i.p., else a.a	a.a
3760	100	MRL: pred dk gry - olv blk, sft - frm, amor - sbblky, i.p., grad clst, also med gry - med dk gry, sft - frm, amor - sbblky	a.a
3770	60	CLST: dk gry - olv blk, sft - frm, amor - blky, v calc, i.p grad MRL	a.a
	40	MRL: a.a	
	Tr	LS: microglauc I.P., else a.a. (cavings?)	
3780	a.a.		a.a.
3790	70	CLST: a.a.	a.a.
	30	MRL: a.a.	
	Tr	LS: a.a.	
3800	a.a.		a.a.
3810	90	CLST: a.a.	a.a.
	10	MRL: a.a.	
	Tr	LS: a.a.	
3820	100	CLST: stky, else a.a.	a.a.
	Tr	MRL: a.a.	
3830	100	CLST: r pa rd gry, else a.a.	a.a.
	Tr	MRL: a.a.	
3840	100	CLST: med gry - dk gry, pa rd gry - gry rd, sft - frm, amor - blky, v calc - calc, stky	a.a.
3850	a.a.		a.a.

WELLSITE SAMPLE DESCRIPTION

Country:	Norway	Area:	North Sea	Field:	Gudrun
Well no.:	15/3-7				
R.T.:	18 meters	Company:	Statoil ASA, Norsk Hydro ASA, TotalFinaElf, BP Amoco		
Hole size:	12 ¼"	Geologist:	Lars Rasmussen / Tor-Arild W Johnsen	Date:	11.06. – 12.06.01

Depth (m RT)	Lithology (%)	Lithological Description: Rock name, mod. lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed. structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
3860	100 CLST:	predom med gry and pa rd gry, minor med gry - dk gry, sft - frm, amor - blky, v calc - calc, stky	No shows
3870	100 CLST:	a.a.	a.a.
	Tr LS:	med lt gry, lt olv gry - gn gry I.P., frm, amor - sbblky, micr, slily arg, microglauc I.P.	
3880	100 CLST:	med gry - dk grey, pa rd gry - gry rd, sft - frm, amor - blky, v calc - calc, sl stky, I.P. microglauc, I.P. slty	a.a.
	Tr LS:	a.a.	
3890	100 CLST:	med dk gry - dk gry, gry rd - brn rd, pred sft, occ frm, amor - blky, slty i.p., microglauc i.p., non calc - calc	a.a
	Tr LS:	a.a	
3900	80 CLST:	calc, stky i.p., else a.a	a.a
	Tr LS:	lt olv gry - lt brnsh gry, frm, sbblky, micr, slily arg	
3910	100 CLST:	pred gry rd - brn rd, occ brnsh gry, else a.a	a.a
	Gd Tr LS:	a.a	
3920	60 CLST:	dk gry - olv blk, occ gry rd - brn rd, sft - frm, amor - blky, v calc grad MRL i.p.	a.a slty i.p.
	40 LS:	lt olv gry - brnsh gry, med lt gry, yel brn, frm blky, micr, sllily arg - arg	
3930	100 CLST:	med gry - med dk gry - dk gnsh gry, occ dk gry, also gry rd - brn rd, sft - frm, stky i.p., v calc, grad MRL i.p., occ microglauc	a.a
	Tr LS:	a.a	
3940	60 CLST:	med dk gry - dk gry, else a.a	a.a.
	40 LS:	a.a	
3950	60 CLST:	a.a	a.a.
	40 LS:	a.a	
3960	70 MRL:	med gry - med dk gry, sft, amor - sbblky, microglauc i.p, stky i.p. occ grad Clst	a.a
	20 LS:	a.a	
	10 CLST:	micropyr i.p., else a.a	
3970	80 MRL:	a.a	a.a
	20 LS:	a.a	
	Tr CLST:	a.a	
3980	60 MRL:	a.a	a.a
	20 LS:	a.a	
	20 CLST:	pred gry rd - brn rd, else a.a.	

WELLSITE SAMPLE DESCRIPTION					Page 23 of 43
Country: Norway		Area: North Sea		Field: Gudrun	
Well no.: 15/3-7					
R.T.: 18 meters		Company:	Statoil ASA, Norsk Hydro ASA, TotalFinaElf, BP Amoco		
Hole size: 12 ¼"		Geologist:	Lars Rasmussen / Tor-Arild W Johnsen	Date:	12.06.01

Depth (m RT)	Lithology (%)	Lithological Description Rock name, mod. lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed. structures, accessories, fossils, porosity, contamination	Remarks Shows, cavings, mud additives, etc.
3990	90	CLST: pred gry rd - brn rd, also med gry - med dk gry - dk gnsh gry, occ dk gry, sft - frm, micropyr i.p.	No shows
	10	MRL: med gry - med dk gry, sft, amor - sbblky, microglauc i.p, stky i.p., occ grad Clst	
	Tr	LS, PYR	
3996	a.a.		a.a. Bottoms up

TD for 12 1/4" hole section at 3996.0 mMD RT/3995.7 mTVD RT

WELLSITE SAMPLE DESCRIPTION

Country:	Norway	Area:	North Sea	Field:	Gudrun
Well no.:	15/3-7				
R.T.:	18 meters	Company:	Statoil ASA, Norsk Hydro ASA, TotalFinaElf, BP Amoco		
Hole size:	8 ½"	Geologist:	Tor Svånå / Oddvar Bøe	Date:	21.06.01

Depth (m RT)	Lithology (%)	Lithological Description: Rock name, mod. lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed. structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
4000	50	CLST: mod brn - gry rd - dsky brn, occ olv gry, mod hd - hd, blky, non - v calc, loc grad Mrl, occ stky	No shows
	40	MRL: gnsh gry - lt olv gry, lt blsh gry, occ med gry, frm - mod hd, blky	
	10	LS: lt gry - yelsh gry, frm - mod hd, blky	
	TR	PYR	
4003	70	CLST: a.a.	a.a.
	30	MRL: grad calc Clst, else a.a.	
	TR	LS: a.a.	
4006	100	CLST: a.a.	a.a.
	Gd tr	MRL: a.a.	
4009	90	CLST: a.a.	a.a.
	10	MRL: a.a.	
4012	80	CLST: a.a.	a.a.
	20	MRL: a.a.	
4015	60	CLST: a.a.	a.a.
	40	MRL: a.a.	
	Tr	LS: mrly, lt gry - lt olv gry, blky, mod hd, f xln	
4018	60	MRL: a.a.	a.a.
	40	CLST: a.a.	
	Tr	LS: a.a.	
4021	60	MRL: a.a.	a.a.
	40	CLST: a.a.	
	Tr	LS: a.a.	
4024	70	MRL: a.a.	a.a.
	30	CLST: a.a.	
4027	60	MRL: a.a.	a.a.
	40	CLST: a.a.	
4030	90	MRL: a.a.	a.a.
	10	CLST: a.a.	
4033	90	MRL: a.a.	a.a.
	10	CLST: a.a.	
	R tr	LS: a.a.	
4036	100	MRL: a.a.	a.a.
	Tr	CLST: a.a.	
4039	100	MRL: a.a.	a.a.
	Tr	CLST: a.a.	

WELLSITE SAMPLE DESCRIPTION

Country:	Norway	Area:	North Sea	Field:	Gudrun
Well no.:	15/3-7				
R.T.:	18 meters	Company:	Statoil ASA, Norsk Hydro ASA, TotalFinaElf, BP Amoco		
Hole size:	8 ½"	Geologist:	Tor Svånå / Oddvar Bøe	Date:	22.06.01

Depth (m RT)	Lithology (%)	Lithological Description: Rock name, mod. lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed. structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
4042	100	MRL: gnsh gry - lt olv gry, lt blsh gry, occ med gry, frm - mod hd, blky	No shows
	Tr	CLST: mod brn - gry rd - dsky brn, occ olv gry, also Tr grysh blk, mod hd - hd, blky, non - v calc, loc grad Mrl, occ stky	
4045	50	MRL: a.a.	a.a.
	50	CLST: olv blk - olv gry, blky, mod hd, non calc	
4048			
4051	70	CLST: olv blk, occ olv gry, mod hd - hd, blky - sbblky, occ slily brit, non calc, slily slty I.P.	a.a.
	30	MRL: lt olv gry - olv gry, frm - mod hd, sbblky - blky, loc grad arg Ls	
4054	80	CLST: a.a.	a.a.
	20	LS: lt gry - lt yelsh gry, frm - mod hd, sbblky - blky, loc grad arg Ls	
4057	80	CLST: non slty, else a.a.	a.a.
	20	MRL: loc mod brn - pa yelsh brn, else a.a.	
4060	90	CLST: a.a.	a.a.
	10	MRL: a.a.	
4063	90	CLST: a.a.	a.a.
	10	SST: lse clr - trnsl Qtz gr, v f, w srt, rndd	
	Tr	MRL: a.a.	
4066	80	CLST: a.a.	a.a.
	10	LS: a.a.	
	10	SST: a.a.	
4069	90	CLST: a.a.	a.a.
	10	LS: a.a.	
	Tr	SST: a.a.	
4072	90	CLST: a.a.	a.a.
	10	LS: a.a.	
	Tr	SST: a.a.	
4075	100	CLST: a.a.	a.a.
	Tr	LS: a.a.	
	R tr	SST: a.a.	
		POOH for bit change at 4076m.	
4078	100	CLST: a.a.	a.a.
		Ran junk bit and cleaned up hole at 4079m.	

WELLSITE SAMPLE DESCRIPTION

Country:	Norway	Area:	North Sea	Field:	Gudrun
Well no.:	15/3-7				
R.T.:	18 meters	Company:	Statoil ASA, Norsk Hydro ASA, TotalFinaElf, BP Amoco		
Hole size:	8 ½"	Geologist:	Per Furmyr / Tor Finn Kristensen	Date:	28. – 29.06.01

Depth (m RT)	Lithology (%)	Lithological Description: Rock name, mod. lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed. structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
4081	100 CLST:	brn blk - olv blk, gry blk, mod hd - hd, blky - occ sbfis, carb - v carb, com micropyr, occ slty/sdy, non calc	No shows
4084	90 CLST:	a.a.	a.a.
	10 SST:	med dk gry - dk gry, clr - trnsl qtz, v f - f, sbrndd, mod hd, v arg grdg sdy Clst, carb, none - pr vis por	
4087	100 CLST:	brn blk - olv blk - gry blk, mod hd - hd, blky - occ sbfis, carb - v carb, com micropyr, occ slily sdy/slty, non calc	a.a.
	Gd tr LS:	med lt gry - lt brn gry, mod hd, micr, com sdy, slily arg, slily carb	
4090	100 CLST:	a.a.	a.a.
	Tr LS:	a.a.	
4093	a.a.		a.a.
4096	90 CLST:	i.p. sdy/slty, i.p. calc - occ v calc, else a.a.	a.a.
	10 LS:	med lt gry, lt brn gry, lt gry, com sdy - v sdy w/v f qtz, else a.a.	
4099	100 CLST:	less sdy/slty, else a.a.	a.a.
	Gd tr LS:	less sdy, else a.a.	
4102	95 CLST:	a.a., but occ w/thin calc lam	a.a.
	5 LS:	lt gry, med lt gry, mod hd, micr, sdy i.p., i.p. arg w/arg lam	
4105	100 CLST:	a.a.	a.a.
	Gd tr LS:	a.a.	
4108	a.a.		a.a.
4111	90 CLST:	brn blk, olv blk, gry blk, mod hd - occ hd, blky - sbfis, carb - v carb, sli micropyr i.p., occ sli sdy/slty, gen non calc, but occ calc i.p.	a.a.
	10 LS:	lt gry, med lt gry, occ off wh, else a.a.	
4114	85 CLST:	a.a.	a.a.
	15 LS:	a.a.	
4117	80 CLST:	a.a.	a.a.
	20 LS:	a.a.	
4120	60 LS:	tr glauc, else a.a.	a.a.
	40 CLST:	i.p. v calc, else a.a.	
4123	80 CLST:	brn blk - olv blk, gry blk, mod hd - hd, blky - sbfis, carb - v carb, micropyr i.p., occ slily sdy/slty, pred non calc, occ slily calc	a.a.
	20 LS:	lt gry - med lt gry, mod hd, micr, sdy i.p., arg w/arg lam	
	Tr SST:	brn gry, clr - trnsl qtz, v hd, sil cmt, pyr, no vis por	

WELLSITE SAMPLE DESCRIPTION

Country:	Norway	Area:	North Sea	Field:	Gudrun
Well no.:	15/3-7				
R.T.:	18 meters	Company:	Statoil ASA, Norsk Hydro ASA, TotalFinaElf, BP Amoco		
Hole size:	8 ½"	Geologist:	Per Furmyr / Tor Finn Kristensen	Date:	29. - 30.06.01

Depth (m RT)	Lithology (%)	Lithological Description: Rock name, mod. lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed. structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
4126	80	CLST: brn blk - olv blk, gry blk, mod hd - hd, blky - sbfis, carb - v carb, micripyr i.p., occ slily - mod slty/sdy, pred non calc, occ mod calc	No shows
	20	LS: lt gry - med lt gry, mod hd, micr, sdy i.p., com arg w/arg lam, occ carb	
	Tr	SST: med dk gry - dk gry, clr - trnsl qtz, v f - f, sbang - sbrndd, mod hd, calc, v arg, no vis por	
4129	50	CLST: a.a.	a.a.
	50	LS: lt gry - med lt gry, frm - mod hd, micr, slily sdy - sdy, occ v sdy, arg i.p. w/arg lam, occ carb	
4132	90	CLST: a.a.	a.a.
	10	LS: a.a.	
4135	50	CLST: a.a.	a.a.
	50	LS: a.a.	
4138	90	CLST: a.a.	a.a.
	10	LS: a.a.	
4141	100	CLST: a.a.	a.a.
	Tr	LS: a.a.	
4144	100	CLST: a.a.	a.a.
	Tr	LS: a.a.	
4147	50	CLST: a.a.	a.a.
	50	LS: lt gry - med lt gry, mod hd, micr, sdy i.p., arg w/arg lam, occ carb	
4150	60	LS: tr f - crs, lse qtz, else a.a.	No direct fluor
	40	CLST: a.a.	Slow, wk, strm yel wh cut fluor from LS
4153	50	CLST: a.a.	a.a.
	50	LS: a.a.	
4156	a.a.		a.a.
4159	70	LS: a.a.	a.a.
	30	CLST: a.a.	
4162	60	CLST: a.a.	Occ min fluor
	40	LS: a.a.	from LS. No shows
4165	95	CLST: a.a.	No shows
	5	LS: a.a.	
4168	100	CLST: a.a.	a.a.
	Tr	LS: i.p. micropyr, else a.a.	
4171	a.a.		a.a.

WELLSITE SAMPLE DESCRIPTION

Country:	Norway	Area:	North Sea	Field:	Gudrun
Well no.:	15/3-7				
R.T.:	18 meters	Company:	Statoil ASA, Norsk Hydro ASA, TotalFinaElf, BP Amoco		
Hole size:	8 ½"	Geologist:	Per Furmyr / Tor Finn Kristensen	Date:	30.06. – 02.07.01

Depth (m RT)	Lithology (%)	Lithological Description: Rock name, mod. lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed. structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
4174	100	CLST: brn blk, gry blk, olv blk, mod hd, blky - sbfis, carb - v carb, com micropyr, pred non calc, occ slily - mod calc	No shows
	Tr	LS: lt gry - med lt gry, mod hd, micr, arg i.p. w/arg lam	
4177	100	CLST: a.a.	a.a.
	Tr	LS: a.a.	
	Tr	SST: clr - trnsl qtz, v f - f, sbang - sbrndd, lse grns	
4180	100	CLST: slily slty i.p., else a.a.	a.a.
4183	100	CLST: brn blk, olv blk, gry blk, mod hd - hd, blky - sbfis, v carb, micropyr, non calc, occ slily calc	a.a.
	Tr	LS: a.a.	
4186	100	CLST: a.a.	a.a.
	Tr	LS: a.a.	
		Samples from 4189m and 4192m was lost due to computerproblems / wrong lag depths!!	
4195	100	CLST: brn blk, gry blk, olv blk, blky - sbfis, mod hd - hd, v carb, micropyr, loc slily sday, non calc	a.a.
	Sl tr	SST: med gry - med dk gry, clr - trnsl qtz, f - med, mod hd, calc cmt, arg, pyr, none - pr vis por	
4198	100	CLST: a.a.	a.a.
	Tr	LS: lt gry - med lt gry, mod hd, micr, sdy, slily arg, slily carb	
4201	100	CLST: a.a.	a.a.
	Tr	LS: a.a.	
	Tr	SST: med lt gry, clr - trnsl qtz, v f, mod hd, calc cmt, com pyr, no vis por	
4204	100	CLST: brn blk, gry blk, olv blk, mod hd - hd, blky - sbfis, v carb, micropyr, occ slily slty/sdy, non calc	a.a.
	Tr	LS: lt gry - med lt gry, mod hd, micr, arg, loc sdy	
4207	100	CLST: a.a.	a.a.
	Tr	LS: a.a.	
	Tr	SST: med lt gry, clr - trnsl qtz, v f - f, occ med, ang - sbrndd, hd, calc cmt, arg i.p., slily pyr, none - pr vis por	
4210	80	CLST: a.a.	a.a.
	20	LS: lt gry - med lt gry, mod hd, micr, slily arg - arg, sdy i.p.	
	Gd tr	SST: med lt gry - med dk gry, clr - trnsl qtz, v f - f, mod hd - hd, sil? cmt, tr calc cmt, arg i.p., none - pr vis por	
4213	60	CLST: a.a.	a.a.
	40	SST: med lt gry - med dk gry, clr - trnsl qtz, pred v f - f, occ med - crs grns, mod srt, ang - sbrndd, app mod hd - hd, sil? cmt, calc cmt, arg i.p., occ carb, app pr - occ mod vis por	

WELLSITE SAMPLE DESCRIPTION

Country:	Norway	Area:	North Sea	Field:	Gudrun
Well no.:	15/3-7				
R.T.:	18 meters	Company:	Statoil ASA, Norsk Hydro ASA, TotalFinaElf, BP Amoco		
Hole size:	8 ½"	Geologist:	Per Furmyr / Tor Finn Kristensen	Date:	02.07.01

Depth (m RT)	Lithology (%)	Lithological Description: Rock name, mod. lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed. structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
4216	70	CLST: brn blk, gry blk, olv blk, mod hd - hd, blky - sbfis, v carb, micropyr, occ slily slty/sdy, non calc	No shows
	30	SST: med lt gry - med dk gry, clr - trnsl qtz, pred v f - f, i.p. med - v crs, pr srt, ang - sbrndd, app fri - hd, sil cmt, tr calc cmt, occ arg, occ carb, app pr - occ fair vis por	
4219	50	LS: lt gry - med lt gry - med gry, mod hd, micr, slily arg - arg, sdy i.p., occ micropyr	a.a.
	30	CLST: a.a.	
	20	SST: med lt gry, clr - trnsl qtz, v f - crs, pr srt, ang - sbrndd, app fri - hd, sil & calc cmt, occ arg, app pr - fair vis por	
4222	85	LS: a.a.	a.a.
	10	CLST: pred gry blk - blk, else a.a.	
	5	Sst: sil cmt, app none - pr vis por, else a.a.	
4225	50	LS: a.a.	a.a.
	30	CLST: brn blk - olv blk, gry blk, mod hd - hd, blky - sbfis, carb - v carb, com micropyr, occ slty/sdy, pred non calc, occ slily calc	
	20	SST: med lt gry, clr - trnsl qtz, v f - crs, pr srt, ang - sbrndd, app mod hd - hd, sil cmt, tr calc cmt, occ arg, app none - pr vis por	
4228	50	CLST: brn blk - olv blk, occ gry blk, mod hd, blky - sbfis, carb - v carb, com micropyr - dissem pyr, occ slty/sdy, pred non calc, occ slily calc	a.a.
	40	SST: med lt gry, clr - trnsl qtz, v f - crs, pr srt, ang - sbrndd, pred as lse qtz, app mod hd - hd, sil cmt, tr calc cmt, occ arg, app none - pr vis por	
	10	LS: a.a.	
4231	65	CLST: a.a.	a.a.
	30	LS: com arg w/arg lam, v sdy i.p., else a.a.	
	5	SST: a.a.	
4234	50	LS: a.a.	a.a.
	35	CLST: a.a.	
	15	SST: a.a.	
4237	80	LS: lt gry, occ vlt gry - off wh, also med lt gry - med gry and arg - v arg, occ w/arg lam, mod hd, micr, sdy i.p., tr micropyr	a.a.
	20	CLST: a.a.	
	Tr	SST: a.a.	
4240	75	CLST: a.a.	a.a.
	20	LS: a.a.	
	5	SST: f - crs - occ v crs	
4243	70	LS: i.p. v arg - occ grad CALC CLST, else a.a.	a.a.
	30	CLST: i.p. calc - v calc - occ grad ARG LS, else a.a.	
	Tr	SST: a.a.	

WELLSITE SAMPLE DESCRIPTION

Country:	Norway	Area:	North Sea	Field:	Gudrun
Well no.:	15/3-7				
R.T.:	18 meters	Company:	Statoil ASA, Norsk Hydro ASA, TotalFinaElf, BP Amoco		
Hole size:	8 ½"	Geologist:	Per Furmyr / Tor Finn Kristensen	Date:	03. - 05.07.01

Depth (m RT)	Lithology (%)		Lithological Description: Rock name, mod. lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed. structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
4246	80	LS:	lt gry, occ vlt gry - off wh, also med lt gry - med gry and arg - v arg, occ grad CALC CLST, occ w/arg lam, mod hd, micr, sdy i.p., tr micropyr	No shows
	20	CLST:	brn blk - olv blk, occ gry blk, mod hd, blky - sbfis, carb - v carb, com micropyr - dissem pyr, occ slty/sdy, pred non calc, occ slily calc, i.p. calc - v calc - occ grad ARG LS, else a.a.	
	Tr	SST:	med lt gry, clr - trnsl qtz, v f - crs, tr v crs,pr srt, ang - sbrndd, pred as lse qtz	
4249	60	LS:	a.a.	a.a.
	40	CLST:	a.a.	
	Tr	SST:	a.a.	
4252	50	LS:	a.a.	a.a.
	50	CLST:	a.a.	
	Tr	SST:	a.a.	
4255	50	CLST:	a.a.	a.a.
	45	LS:	i.p. sdy a.a.	
	5	SST:	a.a.	
	Sli tr	PYR		
4258	70	CLST:	a.a.	a.a.
	30	LS:	a.a.	
	Gd tr	SST:	med lt gry - med gry, clr - trnsl qtz, f - crs, pr srt, ang - sbrndd, hd - v hd i.p., app as lse grns i.p., sil cmt, slily carb, slily pyr	
4261	80	CLST:	a.a.	a.a.
	20	LS:	a.a.	
	Tr	SST:	a.a.	
4264	50	CLST:	i.p. v slty/sdy and micropyr, else a.a.	a.a.
	50	LS:	tr glauc, else a.a.	
	Sli tr	SST:	a.a.	
4267	80	LS:	i.p. v sdy, else a.a.	a.a.
	20	CLST:	a.a.	
	Tr	SST:	a.a.	
4270	40	SST:	med lt gry - med gry, clr - trnsl qtz, f - crs, pr srt, ang - sbrndd, hd - v hd i.p., app as lse grns i.p., sil cmt, also calc cmt (?), slily carb, slily pyr, app pr vis por	a.a.
	30	LS:	a.a.	
	30	CLST:	a.a.	
4273	60	CLST:	a.a.	a.a.
	35	LS:	a.a.	
	5	SST:	a.a.	

WELLSITE SAMPLE DESCRIPTION

Country:	Norway	Area:	North Sea	Field:	Gudrun
Well no.:	15/3-7				
R.T.:	18 meters	Company:	Statoil ASA, Norsk Hydro ASA, TotalFinaElf, BP Amoco		
Hole size:	8 ½"	Geologist:	Per Furmyr / Tor Finn Kristensen	Date:	05.07.01

Depth (m RT)	Lithology (%)	Lithological Description: Rock name, mod. lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed. structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
4276	50 SST:	med lt gry, clr - trnsl qtz, v f - crs, pr srt, ang - sbrndd, hd - v hd, sil cmt, tr calc cmt, slily pyr i.p., occ arg/carb, app pr vis por	No shows
	30 LS:	lt gry - med lt gry, mod hd - hd, micr, slily arg - occ arg w/arg lam, sdy i.p., occ slily pyr	
	20 CLST:	brn blk, gry blk, olv blk, mod hd - hd, blky - sbfis, carb - v carb, micropyr, loc sdy, pred non calc	
4279	30 SST:	a.a.	a.a.
	40 LS:	a.a.	
	30 CLST:	a.a.	
4282	80 LS:	a.a.	a.a.
	20 CLST:	a.a.	
	Gd tr SST:	a.a.	
4285	50 SST:	tr v crs, v pr srt, else a.a.	a.a.
	30 CLST:	a.a.	
	20 LS:	a.a.	
4288	80 LS:	a.a.	a.a.
	15 CLST:	a.a.	
	5 SST:	a.a.	
4291	50 CLST:	a.a.	a.a.
	30 LS:	a.a.	
	20 SST:	a.a.	
4294	70 LS:	pred med lt gry, occ brn gry, pred arg, i.p. slty, else a.a.	a.a.
	25 CLST:	a.a.	
	5 SST:	a.a.	
4297	60 LS:	a.a.	a.a.
	30 CLST:	a.a.	
	10 SST:	a.a.	
4300	65 LS:	frm - mod hd, else a.a.	~10% of LS have orng - pa wh fluor, sl bloom bl wh cut fluor, bl wh fluor res ring
	30 CLST:	gry blk - blk, olv blk, brn blk, else a.a.	
	5 SST:	a.a.	
4303	60 LS:	a.a.	a.a.
	40 CLST:	a.a.	
4306	70 CLST:	gry blk - blk, olv blk, else a.a.	a.a.
	30 LS:	a.a.	
4309	80 CLST:	occ mod brn, else a.a.	a.a.
	20 LS:	a.a.	

WELLSITE SAMPLE DESCRIPTION

Country:	Norway	Area:	North Sea	Field:	Gudrun
Well no.:	15/3-7				
R.T.:	18 meters	Company:	Statoil ASA, Norsk Hydro ASA, TotalFinaElf, BP Amoco		
Hole size:	8 ½"	Geologist:	Per Furmyr / Lars Rasmussen	Date:	06.07.01

Depth (m RT)	Lithology (%)	Lithological Description: Rock name, mod. lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed. structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
4312	95	CLST: gry blk - blk, olv blk, occ mod brn, mod hd - hd, blky - sbfis, carb - v carb, micropyr, loc sdy, pred non calc	No shows orng -yel min fluor in LS
	5	LS: lt gry - med lt gry, frm - mod hd, micr, slily arg - occ arg w/arg lam, sdy i.p., occ slily pyr	
	TR	SST: med lt gry, clr - trnsl qtz, v f - crs, pr srt, ang - sbrndd, hd - v hd, sil cmt, tr calc cmt, slily pyr i.p., occ arg/carb, tr glauc, app pr vis por	
4315	95	CLST: a.a.	a.a.
	5	LS: a.a.	
4318	90	CLST: a.a.	a.a.
	10	LS: a.a.	
4321	50	CLST: a.a.	a.a.
	50	LS: a.a.	
4324	60	CLST: a.a.	a.a.
	30	LS: i.p. v sdy, else a.a.	
	10	SST: v f - med, mod srt, occ calc cmt, else a.a.	
4327	50	CLST: gry blk - blk, olv blk, occ dk gry, tr med dk gry, mod hd, occ frm, blky - sbfis, carb - v carb, micropyr, loc sdy, pred non calc, i.p. v calc w/lam of LS	a.a
	25	LS: occ off wh, also occ med gry and v arg, sft and stky - grad CALC CLST, else a.a.	
	15	SST: a.a. but pred app as lse qtz	
4330	50	LS: a.a.	a.a.
	30	SST: lt gry, clr - trnsl qtz, pred app as lse qtz, pred sil cmt, occ calc cmt, v f - med - occ crs, mod - pr srt, ang - sbrndd, hd - v hd, tr pyr, app pr vis por	
	20	CLST: a.a.	
4333	70	SST: f - med, occ crs, tr v crs, pr srt, else a.a.	a.a.
	20	LS: a.a.	
	10	CLST: a.a.	
4336	70	LS: i.p. v sdy, frm - occ sft, else a.a.	a.a.
	20	SST: a.a.	
	10	CLST: a.a.	
4339	85	LS: lt gry - med lt gry, occ off wh, frm - mod hd, micr, slily arg - occ arg w/arg lam, sdy i.p., occ slily pyr	
	10	SST: a.a.	
	5	CLST: a.a.	
4342	50	SST: a.a.	a.a.
	40	LS: a.a.	
	10	CLST: a.a.	

WELLSITE SAMPLE DESCRIPTION

Country:	Norway	Area:	North Sea	Field:	Gudrun
Well no.:	15/3-7				
R.T.:	18 meters	Company:	Statoil ASA, Norsk Hydro ASA, TotalFinaElf, BP Amoco		
Hole size:	8 ½"	Geologist:	Per Furmyr / Lars Rasmussen	Date:	06. - 08.07.01

Depth (m RT)	Lithology (%)	Lithological Description: Rock name, mod. lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed. structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
4345	65	LS: lt gry - med lt gry, occ off wh, frm - mod hd, micr, slily arg - occ arg w/arg lam, sdy i.p., occ slily pyr	No shows
	25	SST: lt gry, clr - trnsl qtz, pred app as lse qtz, pred sil cmt, occ calc cmt, v f - med - occ crs, mod - pr srt, ang - sbrndd, hd - v hd, tr pyr, app pr vis por	
	10	CLST: gry blk - blk, olv blk, occ dk gry, tr med dk gry, mod hd, occ frm, blky - sbfis, carb - v carb, micropyr, loc sdy, pred non calc, i.p. v calc w/lam of LS	
4348	90	LS: a.a.	a.a.
	10	CLST: a.a.	
	Tr	SST: a.a.	
4351	60	CLST: dsky yel brn, olv blk - brn blk, occ gry blk - blk, frm - mod hd, blky - sbfis, slty, sdy i.p., carb, sli micropyr, gen non calc, occ calc, 10% blk, hd, burnt	No shows Turbodrilling from 4349m.
	20	LS: lt gry, yel gry - off wh, med lt gry - med bl gry, mod hd, micr, occ arg	
	20	SST: a.a.	
4354	85	LS: a.a.	a.a.
	10	CLST: a.a.	
	5	SST: a.a.	
4357	50	SST: a.a.	No shows
	30	LS: occ sft, blky - amor - altered by bit action, else a.a.	small cuttings
	20	CLST: a.a., but also occ sft, blky - amor - altered by bit action	large part rk flour from bit action
4360	70	LS: i.p. glauc, else a.a.	a.a.
	25	CLST: a.a.	also only small
	5	SST: a.a.	amount of cuttings
4363	80	CLST: a.a.	a.a.
	20	LS: a.a.	
	Tr	SST: a.a.	
4366	60	CLST: a.a.	a.a.
	30	LS: a.a.	
	10	SST: a.a.	
4369	90	CLST: a.a.	a.a.
	10	LS: a.a.	
	TR	SST: a.a.	
4372	70	CLST: also occ mod brn, else a.a.	a.a.
	20	LS: a.a.	
	10	SST: a.a.	
4375	90	CLST: main part is hd, burnt, else a.a.	a.a.
	10	LS: a.a.	

WELLSITE SAMPLE DESCRIPTION

Country:	Norway	Area:	North Sea	Field:	Gudrun
Well no.:	15/3-7				
R.T.:	18 meters	Company:	Statoil ASA, Norsk Hydro ASA, TotalFinaElf, BP Amoco		
Hole size:	8 ½"	Geologist:	Per Furmyr / Lars Rasmussen	Date:	08.07.01

Depth (m RT)	Lithology (%)	Lithological Description: Rock name, mod. lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed. structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
4378	90	CLST: ~10-20% is hd, burnt, dsky yel brn, olv blk - brn blk, occ gry blk - blk, frm - hd, blky - - amor - altered by bit action, slty, sdy i.p., carb, sli micropyr, gen non calc, occ calc,	No shows
	10	LS: lt gry, yel gry - off wh, med lt gry - med bl gry, mod hd, occ sft, micr, occ arg, blky - amor - altered by bit action, i.p. galuc	
	Tr	SST: lt gry, clr - trnsl qtz, pred app as lse qtz, pred sil cmt, occ calc cmt, v f - med - occ crs, mod - pr srt, ang - sbrndd, hd - v hd, tr pyr, app pr vis por	
4381	80	CLST: dsky yel brn, olv blk - brn blk, occ gry blk - blk, frm - mod hd, blky - sbfis, slty, sdy i.p., carb, sli micropyr, gen non calc, occ calc, 10% blk, hd, burnt	a.a. small amounts of cuttings, which are often burnt by the I.P. Glauc turbine bit. CLST overrepresented med - occ crs, mod due to LS and SST go thru shakers
	20	LS: lt gry, yel gry - off wh, med lt gry - med bl gry, mod hd, micr, occ arg	
	Tr	SST: lt gry, clr - trnsl qtz, pred app as lse qtz, pred sil cmt, occ calc cmt, v f - - pr srt, ang - sbrndd, hd - v hd, tr pyr, app pr vis por	
4384	60	CLST: large portion burnt, else a.a.	a.a.
	30	SST: a.a.	
	10	LS: a.a.	
4387	60	CLST: a.a.	a.a.
	40	LS: a.a.	
	Tr	SST: a.a.	
4390	50	SST: lt olv gry - lt brn gry, clr - trnsl qtz, pred app as lse qtz, occ wl calc and sil cmt SST, v f - med - occ crs, mod - pr srt, ang - sbrndd, hd - v hd, carb, tr pyr, app pr vis por	a.a
	30	CLST: a.a.	
	20	LS: a.a.	
4393	60	SST: a.a.	a.a.
	20	LS: a.a.	
	20	CLST: a.a.	
4396	a.a.		a.a.
4399	80	CLST: a.a.	a.a.
	10	SST: a.a.	
	10	LS: a.a.	
4402	70	CLST: a.a.	a.a.
	25	SST: a.a.	
	5	LS: a.a.	
4405	50	CLST: a.a.	a.a.
	40	SST: a.a.	
	10	LS: a.a.	

WELLSITE SAMPLE DESCRIPTION

Country:	Norway	Area:	North Sea	Field:	Gudrun
Well no.:	15/3-7				
R.T.:	18 meters	Company:	Statoil ASA, Norsk Hydro ASA, TotalFinaElf, BP Amoco		
Hole size:	8 ½"	Geologist:	Per Furmyr / Lars Rasmussen	Date:	08. - 10.07.01

Depth (m RT)	Lithology (%)	Lithological Description: Rock name, mod. lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed. structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
4408	50	CLST: dsky yel brn, olv blk - brn blk, occ gry blk - blk, frm - mod hd, blky - sbfis, slty, sdy i.p., carb, sli micropyr, gen non calc, occ calc, 10% blk, hd, burnt	No shows small amounts of cuttings, which are often burnt by the turbine bit. CLST overrepresented due to LS and SST go thru shakers
	50	SST: lt olv gry - lt brn gry, clr - trnsl qtz, pred app as lse qtz, occ wl calc and sil cmt SST, v f - med - occ crs, mod - pr srt, ang - sbrndd, hd - v hd, carb, tr pyr, app pr vis por	
	Gd tr	LS: lt gry, yel gry - off wh, med lt gry - med bl gry, mod hd, micr, occ arg i.p. glauc	
4411	80	CLST: a.a.	a.a.
	20	SST: a.a.	
	Gd tr	LS: a.a.	
4414	70	CLST: a.a.	a.a.
	30	SST: a.a.	
	Gd tr	LS: a.a.	
4417	100	CLST: a.a.	No shows
	Gd Tr	LS: a.a.	Less cuttings are
	Tr	SST: a.a.	burnt.
4420	100	CLST: occ slty, else a.a.	No shows sl strm
	GD Tr	SST: a.a.	yel wh cut flour
	Tr	LS: no Glauc, else a.a.	from CLST
4423	a.a.		a.a.
4426	100	CLST: a.a.	a.a.
	Tr	LS, SST: a.a.	
4429	100	CLST: a.a.	a.a.
	Gd Tr	SST: grad SLTST, else a.a.	
	Tr	LS: a.a.	
4432	a.a.		a.a.
4435	100	CLST: 50 - 70% burnt, else a.a.	a.a.
	Gd Tr	LS: a.a.	
4438	a.a.		a.a.
4441	100	CLST: a.a.	a.a.
		Gd tr LS:	
4444	a.a.		a.a.
4447	95	CLST: a.a.	a.a.
	5	SST: a.a.	
	Tr	LS: a.a.	

WELLSITE SAMPLE DESCRIPTION

Country:	Norway	Area:	North Sea	Field:	Gudrun
Well no.:	15/3-7				
R.T.:	18 meters	Company:	Statoil ASA, Norsk Hydro ASA, TotalFinaElf, BP Amoco		
Hole size:	8 ½"	Geologist:	Per Furmyr / Lars Rasmussen / Inger Winsvold	Date:	11. - 13.07.01

Depth (m RT)	Lithology (%)	Lithological Description: Rock name, mod. lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed. structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
4450	100	CLST: dsky yel brn, olv blk - brn blk, occ gry blk - blk, frm - mod hd, blky - sbfis, occ slty, sdy i.p., carb, sli micropyr, gen non calc, occ calc, 10% blk, hd, burnt	No fluor, sl strm yel wh cut fluor from CLST
	Gd tr	SST: lt olv gry - lt brn gry, clr - trnsl qtz, app pred as lse qtz, occ wl calc and sil cmt SST, v f - med - occ crs, mod - pr srt, ang - sbrndd, hd - v hd, carb, tr pyr, app pr vis por	
	Tr	LS: lt gry, yel gry - off wh, med lt gry - med bl gry, mod hd, micr, occ arg	
4453	95	CLST: a.a.	a.a.
	5	SST: a.a.	
	Tr	LS: a.a.	
4456	100	CLST: a.a.	a.a.
	Tr	SST: a.a.	
	Tr	LS: a.a.	
4459	a.a.		a.a.
4462	Missing		
4465	100	CLST: dsky yel brn, olv blk - brn blk, occ gry blk - blk, occ mod brn, frm - mod hd, blky - sbfis, occ slty, sdy i.p., carb, sli micropyr, gen non calc, occ calc,	No fluor, v sl strm yel wh cut fluor from CLST
	Tr	SST: lt olv gry - lt brn gry, clr - trnsl qtz, occ wl calc and sil cmt SST, v f - med, mod - pr srt, ang - sbrndd, hd - v hd, carb, tr pyr, app pr vis por	
	Tr	LS: a.a.	
4468	80	CLST: a.a.	a.a., cont. of mud additives
	20	SST: lt olv gry - lt brn gry, clr - trnsl qtz, app pred as lse qtz, occ wl calc and sil cmt SST, v f - med - occ crs, mod - pr srt, ang - sbrndd, hd - v hd, carb, tr pyr, app pr vis por	
	Tr	LS: a.a.	
4471	100	CLST: pred olv blk - brn blk, occ mod brn, frm - mod hd, blky - sbfis, occ slty, slily micropyr, gen non calc, occ calc	No fluor, v sl strm yel wh cut fluor from CLST
	Tr	LS: a.a.	
4474	a.a.		a.a.
4477	Missing		
4480	100	CLST: gry blk - blk, occ olv blk - blk brn, frm - mod hd, occ slty, slily micropyr, non calc	No shows
	Tr	SST: lt brn gry, clr - trnsl Qtz , app pred lse, v f - f, mod - pr srt, ang - sbang hd - v hd, app pr vis por	
4483	80	CLST: a.a.	a.a.
	20	SST: a.a.	
	Tr	LS: a.a.	

WELLSITE SAMPLE DESCRIPTION

Country:	Norway	Area:	North Sea	Field:	Gudrun
Well no.:	15/3-7				
R.T.:	18 meters	Company:	Statoil ASA, Norsk Hydro ASA, TotalFinaElf, BP Amoco		
Hole size:	8 ½"	Geologist:	Lars Rasmussen / Inger Winsvold	Date:	13.07.01

Depth (m RT)	Lithology (%)	Lithological Description: Rock name, mod. lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed. structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
4486	70	CLST: gry blk - blk, occ olv blk - blk brn, frm - mod hd, occ slty, slily micropyr, non calc	No shows
	30	SST: lt brn gry, clr - trnsl Qtz , app pred lse, v f - f, mod - pr srt, ang - sbang hd - v hd, app pr vis por	
	Tr	LS: lt gry, yel gry - off wh, med lt gry - med bl gry, mod hd, micr, occ arg	
4489	100	CLST: a.a.	a.a.
	r Tr	SST: a.a.	
4492	a.a.		a.a.
4495	100	CLST: gry blk - blk, also olv blk - blk brn, frm - mod hd, blky - sbfiss, occ slty, slily micropyr, non calc	a.a.
	r Tr	LS: a.a.	
4498	a.a.		a.a.
4501	100	CLST: a.a.	a.a.
4504	a.a.		a.a.
4507	a.a.		a.a.
4510	100	CLST: a.a.	a.a.
	r Tr	SST lt brn gry, clr - trnsl Qtz , app pred lse, v f - f, mod - pr srt, ang - sbang hd - v hd, app pr vis por	
4513	100	CLST: a.a.	a.a.
	r Tr	SST/SLTST: a.a.	
4516	100	CLST: a.a.	a.a.
	r Tr	LS: a.a.	
4519	a.a.		a.a.
4522	100	CLST: a.a.	a.a.
4525	100	CLST: a.a.	a.a.
	r Tr	LS: a.a.	
4528	100	CLST: a.a.	a.a.
4531	a.a.		a.a.
4534	a.a.		a.a.
4537	a.a.		a.a.
4540	a.a.		a.a.

WELLSITE SAMPLE DESCRIPTION

Country:	Norway	Area:	North Sea	Field:	Gudrun
Well no.:	15/3-7				
R.T.:	18 meters	Company:	Statoil ASA, Norsk Hydro ASA, TotalFinaElf, BP Amoco		
Hole size:	8 ½"	Geologist:	Lars Rasmussen / Inger Winsvold	Date:	17. - 18.07.01

Depth (m RT)	Lithology (%)	Lithological Description: Rock name, mod. lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed. structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
4543	100	CLST: gry blk - blk, also olv blk - blk brn, frm - mod hd, blky - sbfiss, occ slty, slily micropyr, non calc	No shows
	r Tr	LS: lt gry, yel gry - off wh, med lt gry, mod hd, micr, occ arg	
4546	100	CLST: a.a.	a.a.
	Tr	LS: a.a.	
4549	100	CLST: a.a.	a.a.
	Tr	LS: a.a.	
	Tr	Pyr	
4552	100	CLST: olv blk - dk gry, frm - mod hd, blky - sbfiss, occ slty, slily micropyr, non - slily calc	a.a.
	R Tr	LS: a.a.	
4555	100	CLST: a.a.	a.a.
	Gd Tr	SST/SLST: olv gry - med lt gry, v f - slty, gd srt, sbrnd, frm, slily sil cmt, poor vis por	
4558	70	CLST: a.a.	a.a.
	30	LS: a.a.	
4561	60	CLST: a.a.	a.a.
	40	LS: a.a.	
4564	90	CLST: a.a.	a.a.
	10	LS: lt gry, yel gry - off wh, med lt gry , frm - mod hd, micr, arg	
4567	100	CLST: a.a.	a.a.
	Tr	LS: a.a.	
4570	a.a.		a.a.
4573	a.a.		a.a.
4576	a.a.		a.a.
4579	100	CLST: olv blk - dk gry, gry blk, frm - mod hd, blky - sbfiss, occ slty, slily micropyr, non - slily calc	a.a.
4582	100	CLST: a.a.	a.a.
4585	a.a.		a.a.
4588	a.a.		a.a.
4591	100	CLST: micropyr, else a.a.	a.a.
4594	a.a.		a.a.
4597	a.a.		a.a.

WELLSITE SAMPLE DESCRIPTION

Country:	Norway	Area:	North Sea	Field:	Gudrun
Well no.:	15/3-7				
R.T.:	18 meters	Company:	Statoil ASA, Norsk Hydro ASA, TotalFinaElf, BP Amoco		
Hole size:	8 ½"	Geologist:	L. Rasmussen / I. Winsvold / P. Caine / T. Svånå	Date:	18.07 - 06.08.01

Depth (m RT)	Lithology (%)	Lithological Description: Rock name, mod. lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed. structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
4600	100	CLST: olv blk - dk gry, gry blk, frm - mod hd, blky - sbfiss, occ slty, micropyr, non - slily calc	No shows
4603	a.a.		a.a.
4606	90	CLST: a.a.	No fluor.
	10	LS: a.a.	V wk blmg bl wh cut fluor.
	Tr	SST: clr - trnsl Qtz, wh - lt gry, v f - f, occ med, mod - wl srt, sbang, calc cmt, occ silic cmt, occ micropyr, pr vis por	Bl wh fluor res.
4609	60	SST: clr - trnsl Qtz, wh - lt gry, v f - med, occ crs, mod - wl srt, sbang, calc cmt, occ silic cmt, occ micropyr, pr vis por	Weak pa yel gn fluor, weak sl
	40	CLST: olv blk - dk gry, gry blk, frm - mod hd, blky - sbfiss, occ slty, micropyr, non - slily calc	strmg to blmg bl wh cut fluor, bl wh fluor residue
	Cut core #1:	4609 - 4616.6 mMD. rec. 6.8m, 91%	
	Cut core #2:	4616.5 - 4619 mMD. rec. 1.0m, 40%	
	Milled junk 4619 - 4620.5m		
	Cut core #3:	4620.5 - 4635 mMD. rec. 13.1m, 90.3%	
4639	100	CLST: dk gry - gry blk, blky, sft - mod hd, carb - coaly, non calc	No shows
4640	100	COAL: blk - dk gry, ea, sft - mod hd, grad carb Clst i.p.	a.a., spot sample
4642	100	COAL: a..a.	a.a.
	Tr	SST: lse Qtz gr, clr-trnsl-lt brn, f, sbang - sbrnd	
4643	100	COAL: a..a.	Tr cut fluor in Sst
	Tr	SST: a.a.	
	Cut core #4:	4643 - 4670 mMD. rec. 28.05m, 103.9 %	
4672	100	CLST: gry blk, blky, mod hd, carb, sl slty, non calc	No shows
	Tr	SST:	
4675	100	CLST: a.a.	a..a.
4678	100	CLST: a.a.	a..a.
4681	70	LS: lt brn gry - brn gry, blky, frm, i.p. arg grad calc Clst, f xln	a..a.
	30	CLST: a.a.	
4684	70	CLST: a..a.	a.a.
	30	LS a.a.	
4687	80	CLST: a..a.	a.a.
	20	LS a.a.	
4690	90	CLST: occ calc, else a..a.	a.a.
	10	LS a.a.	

WELLSITE SAMPLE DESCRIPTION

Country:	Norway	Area:	North Sea	Field:	Gudrun
Well no.:	15/3-7				
R.T.:	18 meters	Company:	Statoil ASA, Norsk Hydro ASA, TotalFinaElf, BP Amoco		
Hole size:	8 ½"	Geologist:	Tore Svånå / Håvard Høland	Date:	06. - 07.08.01

Depth (m RT)	Lithology (%)	Lithological Description: Rock name, mod. lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed. structures, accessories, fossils, porosity, contamination		Remarks: Shows, cavings, mud additives, etc.
4693	100	CLST:	gry blk, blky, bcm pred brn blk, mod hd, carb, sl slty, occ calc	No shows
	Gd tr	LS	lt brn gry - brn gry, blky, frm, i.p. arg grad calc Clst, f xln	
4696	100	CLST:	gry blk, else a..a.	a.a.
	Tr	LS	a.a.	
4699	100	CLST:	gry blk, blky, mod hd, carb, sl slty, non calc	a.a.
	Tr	LS:	a.a.	
4702	100	CLST:	a.a.	a.a.
	Tr	LS:	a.a.	
	Tr	SST:	pred lse Qtz gr, f-m, ang	
4705	100	CLST:	a.a.	a.a.
	Tr	LS:	a.a.	
	Tr	SST:	a..a	
4708	100	CLST:	a.a	a.a
	Tr	SST	a.a.	
4711	100	CLST:	a.a.	a.a
4714	100	CLST:	a.a.	a.a.
4717	100	CLST:	a.a.	a.a.
4720	100	CLST:	a.a.	a.a.
4723	100	CLST:	a.a.	a.a.
4726	100	CLST:	a.a.	a.a.
4729	100	CLST:	a.a.	a.a.
4732	100	CLST:	a.a.	a.a.
4735	100	CLST:	a.a.	a.a.
4738	100	CLST:	a.a.	a.a.
	Tr	LS:	off wh - lt brn, blky, frm, pred crs xln (vn infill?)	
4741	100	CLST:	a.a.	a.a.
	Tr	LS:	a.a.	
4744	50	CLST:	a.a.	a.a.
	50	LS:	a.a.	
4745	60	CLST:	a.a.	a.a.
	40	LS:	a.a.	Spot sample

WELLSITE SAMPLE DESCRIPTION

Country:	Norway	Area:	North Sea	Field:	Gudrun
Well no.:	15/3-7				
R.T.:	18 meters	Company:	Statoil ASA, Norsk Hydro ASA, TotalFinaElf, BP Amoco		
Hole size:	8 ½"	Geologist:	Tore Svånå / Håvard Høland	Date:	07.08.01

Depth (m RT)	Lithology (%)	Lithological Description: Rock name, mod. lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed. structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
4746	60	CLST: gry blk - brn blk, blky, mod hd, occ carb, sl slty, non calc	No shows.
	40	LS: off wh - lt brn, blky, frm, pred crs xln (vn infill?)	Spot sample
4747	40	CLST: a.a.	a.a.
	40	LS: a.a.	
	20	SST: clr - lt gry, m, wl srt, sbang w/ Qtz overgrowth, hd, pred lse gr	
4749	40	CLST: a.a.	a.a.
	40	LS: a.a.	Abd Sst rock flor.
	20	SST: clr - lt gry, m - occ crs, wl srt, sbang w/ Qtz overgrowth, hd, pred lse gr	Spot sample.
4750	50	SST: a.a.	a.a.
	40	CLST: a.a.	
	10	LS: a.a.	
4753	10	SST: a.a.	a.a.
	50	CLST: a.a.	
	40	LS: a.a.	
4756	10	SST: a.a.	a.a.
	50	CLST a.a.	
	40	LS: a.a.	
4759	100	CLST: a.a.	No shows
	Gd tr	LS: a.a.	
	Tr	SST: a.a.	
4762	95	CLST: slty, else a.a.	a.a.
	5	LS: i.p. sdy, else a.a.	
	Gd tr	SST: clr, qtz, vf - f, wl srt, v wl sil cmtd, hd, no vis por	
4765	50	CLST: brn blk, dsky yel brn, dsky brn, mod hd, blky, slty i.p., carb and micropyr i.p., non calc	a.a.
	50	SST: pa yel brn, lt gry - occ off wh, vf - f, wl srt, abd rk flr/arg mtrx, occ calc cmt, no - pr vis por, carb i.p., tr agg of clr sil cmt qtz: crs - v crs	
4768	50	CLST: a.a.	a.a.
	10	LS: off wh-lt brn,blky,frm,pred crs xln	
	40	SST: a.a.	
4771	40	CLST: a.a.	a.a.
	10	LS: a.a.	
	50	SST: a.a.	
4774	50	CLST: a.a.	a.a.
	10	LS: a.a.	
	40	SST: a.a.	

WELLSITE SAMPLE DESCRIPTION

Country:	Norway	Area:	North Sea	Field:	Gudrun
Well no.:	15/3-7				
R.T.:	18 meters	Company:	Statoil ASA, Norsk Hydro ASA, TotalFinaElf, BP Amoco		
Hole size:	8 ½"	Geologist:	Per Furmyr	Date:	18.08.01

Depth (m RT)	Lithology (%)	Lithological Description: Rock name, mod. lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed. structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
4777	80	CLST: dsky brn, gry blk, frm - occ mod hd, sbblky, sli carb, non calc	No shows
	10	LS: pa yel brn, off wh - lt gry, frm - mod hd, blky, sli arg i.p.	
	10	SST: pa yel brn, lt gry - occ off wh, vf - f, wl srt, abd rk flr/arg mtrx, occ calc cmt, no - pr vis por, carb i.p., tr agg of clr sil cmt qtz: crs - v crs	
4780	80	SST: brn gry - dk brn gry, occ brnsh trnsp, qtz, pred vf - f, occ f - crs, subang - subrndd, tr rndd when crs, wl sil cmtd, i.p. sli dol cmt, hd - v hd, i.p. carb/arg with incl of blk carb mat, no - pr vis por, 80% of SST is repr. in samples by rk flr: off wh - lt brn, brn gry, frm - sft, sdy, arg i.p., slily dol i.p.	a.a.
	15	CLST: a.a.	
	5	LS: a.a.	
4783	100	SST: tr v crs, else a.a.	a.a.
	Gd tr	CLST: v carb i.p., else a.a.	
	Gd tr	LS: a.a.	
4786	a.a.		a.a.
4789	90	SST: a.a.	a.a.
	10	CLST: dsky yel brn, brn blk, frm - mod hd, sbblky, carb - v carb, i.p. w/dissem pyr, occ w/metallic lustre, non calc	
	Tr	LS: a.a.	
4792	70	SST: a.a.	a.a.
	30	CLST: a.a.	
	Tr	LS: a.a.	
4795	70	CLST: changing to brn blk - occ blk, less slty, else a.a.	a.a.
	30	SST: a.a.	
	Tr	LS: a.a.	
4798	90	CLST: a.a.	a.a.
	10	SST: a.a.	
	Tr	LS: a.a.	
4801	100	CLST: brn blk, occ blk, frm - occ mod hd, sbblky, sli slty, carb - v carb, non calc - occ slily calc	a.a.
4804	a.a.		a.a.
4807	a.a.		a.a.
4810	100	CLST: a.a.	a.a.
	Tr	LS: a.a.	
4813	100	CLST: a.a.	a.a.
4816	a.a.		a.a.

STATOIL

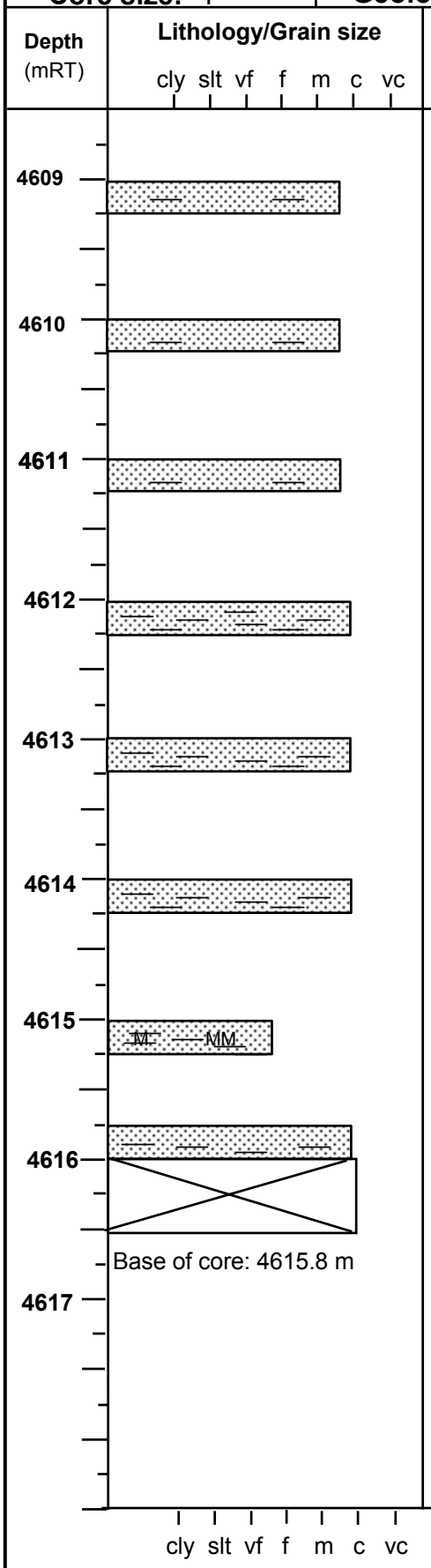
WELLSITE SAMPLE DESCRIPTION					Page 43 of 43
Country: Norway		Area: North Sea		Field: Gudrun	
Well no.: 15/3-7					
R.T.: 18 meters		Company:	Statoil ASA, Norsk Hydro ASA, TotalFinaElf, BP Amoco		
Hole size: 8 ½"		Geologist:	Per Furmyr	Date:	18.08.01
Depth (m RT)	Lithology (%)	Lithological Description Rock name, mod. lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed. structures, accessories, fossils, porosity, contamination			Remarks Shows, cavings, mud additives, etc.
4818	100	Clst:	brn blk, occ blk, frm - occ mod hd, sbblky, sli slty, carb - v carb, non calc - occ slily calc		No shows

TD of well at 4818 m MDRT, 4817.2 m TVDRT, 4799.2 m TVDMSL

App F Core descriptions

CONVENTIONAL CORE DESCRIPTION

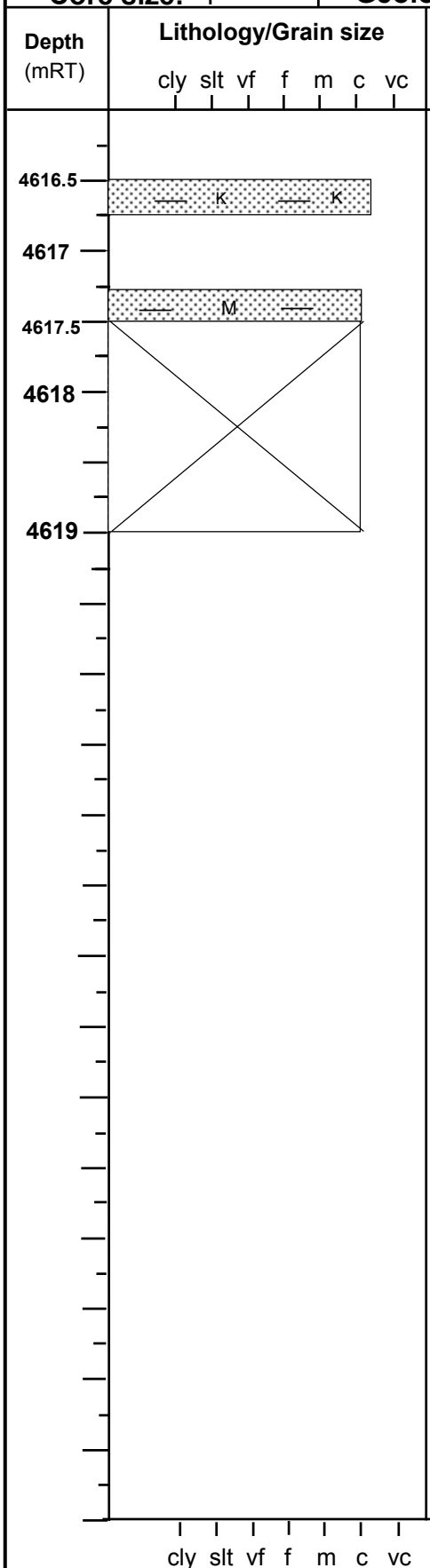
Country: Norway	**Area:** North Sea	**Field:** Gudrun
Well no: 15/3-7	**Formation:** Hugin Fm.	
Core no: 1	**Interval:** 4609 - 4616.5 m MD	**Cored:** 7.5m **Rec:** 6.8 m 91 %
Core size: 4"	**Geologists:** O. Hunnes / P. J. Caine	**Date:** 22.07.01



Shows						Lithological Description	Remarks
STAIN	FLUOR	CUT	POOR	FAIR	GOOD	Rock name, mod. lith., colour, grain size, sorting, roundness, matrix, cementation, hardness, sed. struct., accessories, fossils, porosity, contamination	Shows, etc.
■	■	■		■		**SST :** brn gry, med - crs, subrnd - subang, mod srt, hd, wll sil cmt, non calc, occ dk gry cly mtrx, fr vis por	Mod - strong HC odour, ptchy lt brn stn, ptchy - spty yel wh dir fluor, fst - - mod wh strmg cut fluor, fluor, pl yel gn res
■	■	■		■		**SST :** a.a.	Shows: a.a.
■	■	■		■		**SST :** a.a.	Shows: a.a.
	■	■		■		**SST :** dk gry w/ incr cly mtrx, occ v well sil cmt, poor - fr vis por, else a.a.	Mod HC odour,no stn, r spty dull yel bl dir fluor, v slow to no strmg cut fluor
	■	■		■		**SST :** dk gry sst as above	Shows: a.a.
	■	■		■		**SST :** dk gry sst as above.	Shows: a.a.
	■	■				**SST :** brn gry, vf - f, subang - sbrnd, mod srt, hd - vhd, v well sil cmt, non calc, w/occ mic horizons w/ abdt cly mtrx, no vis por	Wk HC odour, no stn, r - nil spty bl yel dir fluor, v slow - nil strmg / cloudy cut fluor.
	■	■	■			**SST :** brn gry, med - crs, mod srt, subang - sbrnd, hd, wll sil cmt, occ dk gry cly mtrx, poor vis por,	Mod wk HC odour, no stn, r spty yel dir fluor, slow strmg cut fluor.

CONVENTIONAL CORE DESCRIPTION

Country: Norway	**Area:** North Sea	**Field:** Gudrun
Well no: 15/3-7	**Formation:** Hugin Fm.	
Core no: 2	**Interval:** 4616.5 - 4619 m MD	**Cored:** 2.5m **Rec:** 1.0 m 40%
Core size: 4"	**Geologists:** O. Hunnes / P. J. Caine	**Date:** 26.07.01



Shows

STAIN	FLUOR	CUT	POOR	FAIR	GOOD
■	■	■		■	
■	■	■		■	

Lithological Description

Rock name, mod. lith., colour, grain size, sorting, roundness, matrix, cementation, hardness, sed. struct., accessories, fossils, porosity, contamination

SST : brn gry, med - crs, occ v cse, subrnd - subang, mod srt, hd, wll sil cmt, non calc, occ lt gry kaol horizons, tr mica, pr - fr vis por

SST : a.a.

Remarks

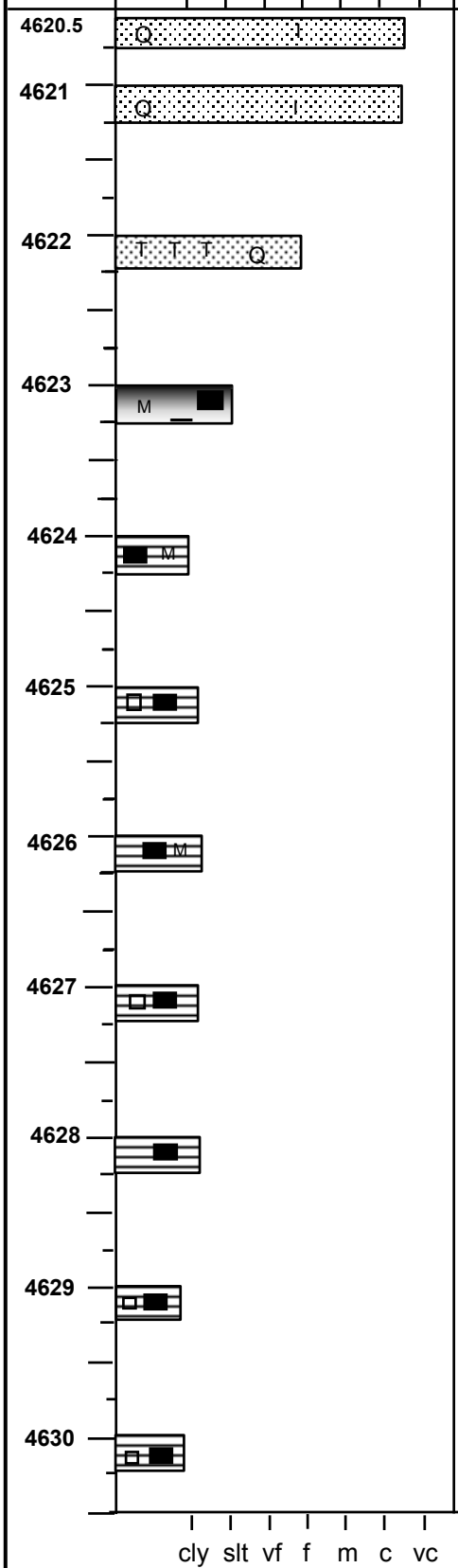
Shows, etc.

Mod - strong HC odour, ptchy lt brn stn, ptchy - spty yel wh dir fluor, mod - slow ylw wh strmg cut fluor,

Strong HC odour, ptchy lt brn stn, ptchy - spty yel wh dir fluor, fst - mod wh strmg cut fluor, pl yel gn res

CONVENTIONAL CORE DESCRIPTION

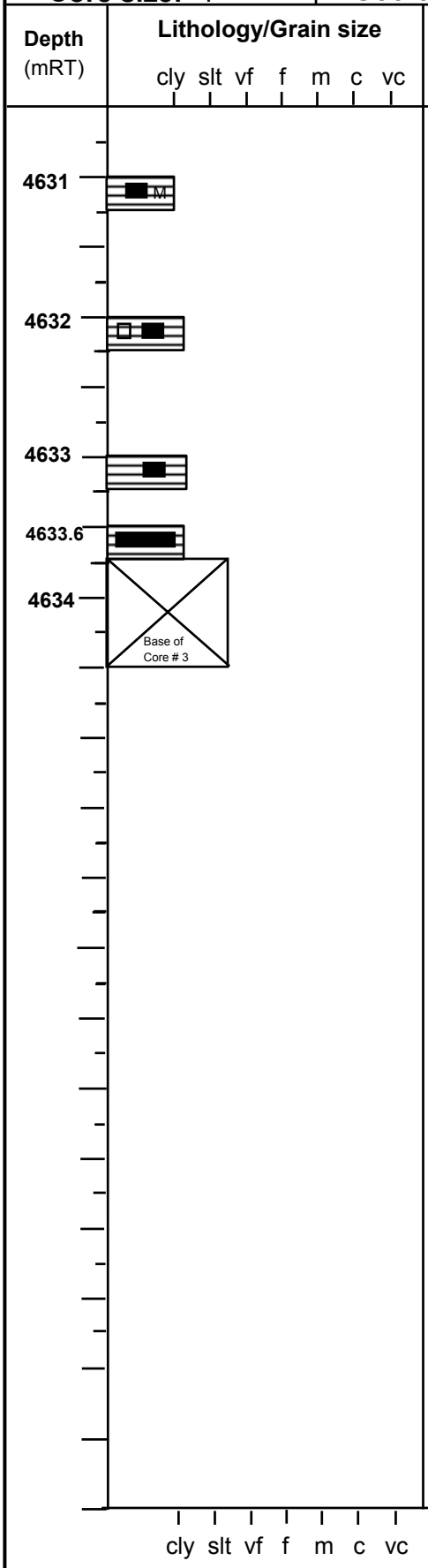
Country: Norway	**Area:** North Sea	**Field:** Gudrun
Well no: 15/3-7	**Formation:** Hugin Fm.	
Core no: 3	**Interval:** 4620.5 - 4635m MD	**Cored:** 14.5m **Rec:** 13.1 m 90.3%
Core size: 4"	**Geologists:** T. Svånå / P. J. Caine	**Date:** 31.07.01



Depth (mRT)	Shows: STAIN / FLUOR / CUT / POOR / FAIR / GOOD	Lithological Description (Rock name, mod. lith., colour, grain size, sorting, roundness, matrix, cementation, hardness, sed. struct., accessories, fossils, porosity, contamination)	Remarks (Shows, etc.)
4620.5 – 4621	FLUOR, CUT, POOR	**SST :** Dk gry, med-crs occ v cse, subrnd - subang i/p ang w/ qtz overgrowth, mod - wl srtd, com dk gry- brn gry arg (?illite) mtx, wl sil cmt, hd, pr - occ fr vis por.	Mod - gd Hc odour, spty blu wh dir fluor, slow strmg bl wh fluor cut. Mod to good HC odour patchy mod ylw direct fluor mod strmg wh cut.Wk blu wh res fluor
4622	POOR	**SST :** Med lt gry,f grn v calc, No vis por else as above.	Mineral flour (uniform moderate yellow)
4623		**SLTST :** Dk gry w/ med lt gry streaks of sst as above., calc, hd,mica, occ carb and arg mat, nc vis por.	Mineral flourescence (dull orange)
4624		**CLYST :** Dk gry, hd,sub-blky to sub-fiss,sl slty i/pt,comm foss frag inc bivalves,carb, tr mica and pyr, non-calc.	No fluor or shows.
4625		**CLYST :** as above	a/a
4626		**CLYST :** as above	a/a
4627		**CLYST :** as above	a/a
4628		**CLYST :** as above	a/a
4629		**CLYST :** as above	a/a
4630			a.a.

CONVENTIONAL CORE DESCRIPTION

Country: Norway	**Area:** North Sea	**Field:** Gudrun
Well no: 15/3-7	**Formation:** Hugin Fm.	
Core no: 3	**Interval:** 4620.5 - 4635m MD	**Cored:** 14.5m **Rec:** 13.1 m 90.3%
Core size: 4"	**Geologists:** T. Svånå / P. J. Caine	**Date:** 31.07.01



Shows

STAIN	FLUOR	CUT	POOR	FAIR	GOOD

Lithological Description

Rock name, mod. lith., colour, grain size, sorting, roundness, matrix, cementation, hardness, sed. struct., accessories, fossils, porosity, contamination

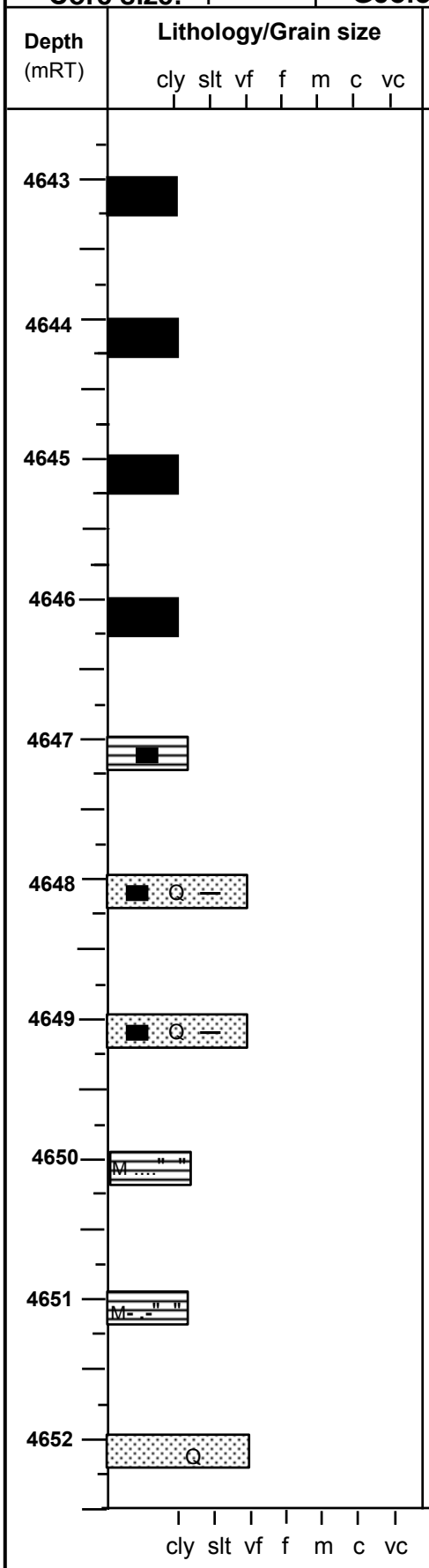
Remarks

Shows, etc.

Lithological Description	Remarks
CLYST : Dk gry, hd,sub-blky to sub-fiss,sl slty i/pt,comm foss frag inc bivalves,carb, tr mica and pyr, non-calc.	No fluor or shows.
CLYST : as above	a/a
CLYST : as above	a/a
CARB CLYST : Dk gry to gry blk,med hd to fri, sub-blky, brit, v. carb.	No fluor or shows.

CONVENTIONAL CORE DESCRIPTION

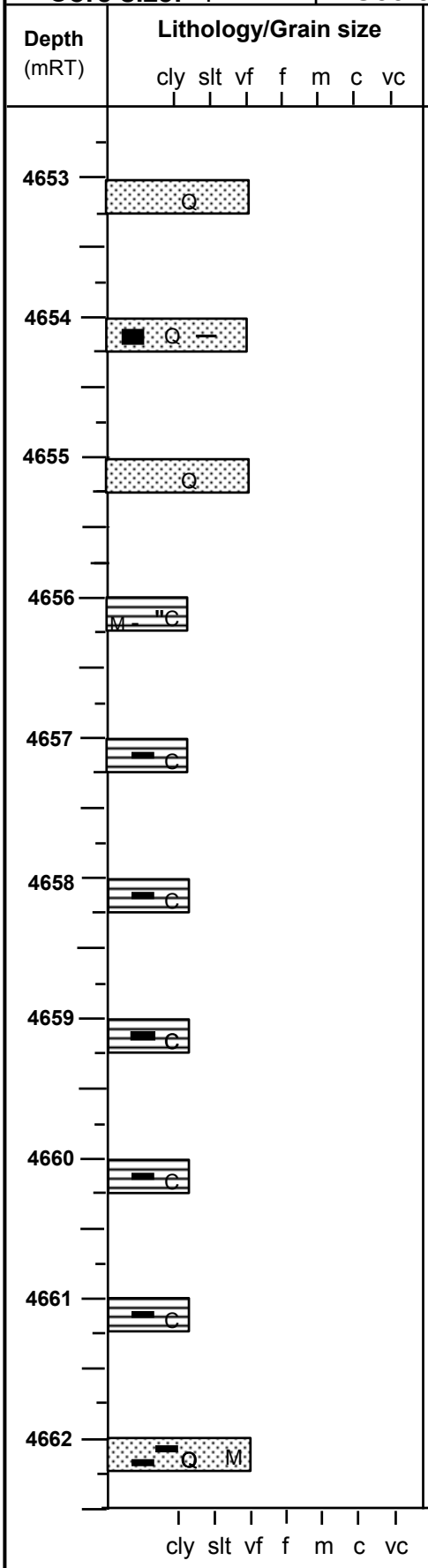
Country: Norway	**Area:** North Sea	**Field:** Gudrun
Well no: 15/3-7	**Formation:** Hugin Fm.	
Core no: 4	**Interval:** 4645 - 4671 m MD	**Cored:** 27m **Rec:** 25.8 m 92%
Core size: 4"	**Geologists:** T. Svånå / H. Høland	**Date:** 04.08.01



Depth (mRT)	Lithological Description (Rock name, mod. lith., colour, grain size, sorting, roundness, matrix, cementation, hardness, sed. struct., accessories, fossils, porosity, contamination)	Remarks (Shows, etc.)
4643	**COAL :** blk, mod hd, brit, shny.	
4644	**COAL:** a.a.	
4645	**COAL:** a.a.	
4646	**COAL:** a.a.	
4647	**CLST :** coaly, gry blk, sbfis, mod hd, carb, sdy, non calc.	
4648	**SST :** brn gry, v f, wl srt, sbang w/ qtz overgrowth, wl sil cmt, hd, coal lam and intercal, pr vis por.	Strong Hc odour, tr spty yel wh fluor, slow strmg weak bl wh cut, tr bl wh fluor resd.
4649	**SST :** a.a.	Shows a.a.
4650	**CLST :** dk gry, sbfis, mod hd - hd, slty - sdy, sl micromic, non calc.	
4651	**CLST :** coaly lam, else a/a.	
4652	**SST :** dk gry, v f, wl srt, sbang - ang due to qtz overgrowth, wl sil cmt, hd, no vis por	Shows a.a.

CONVENTIONAL CORE DESCRIPTION

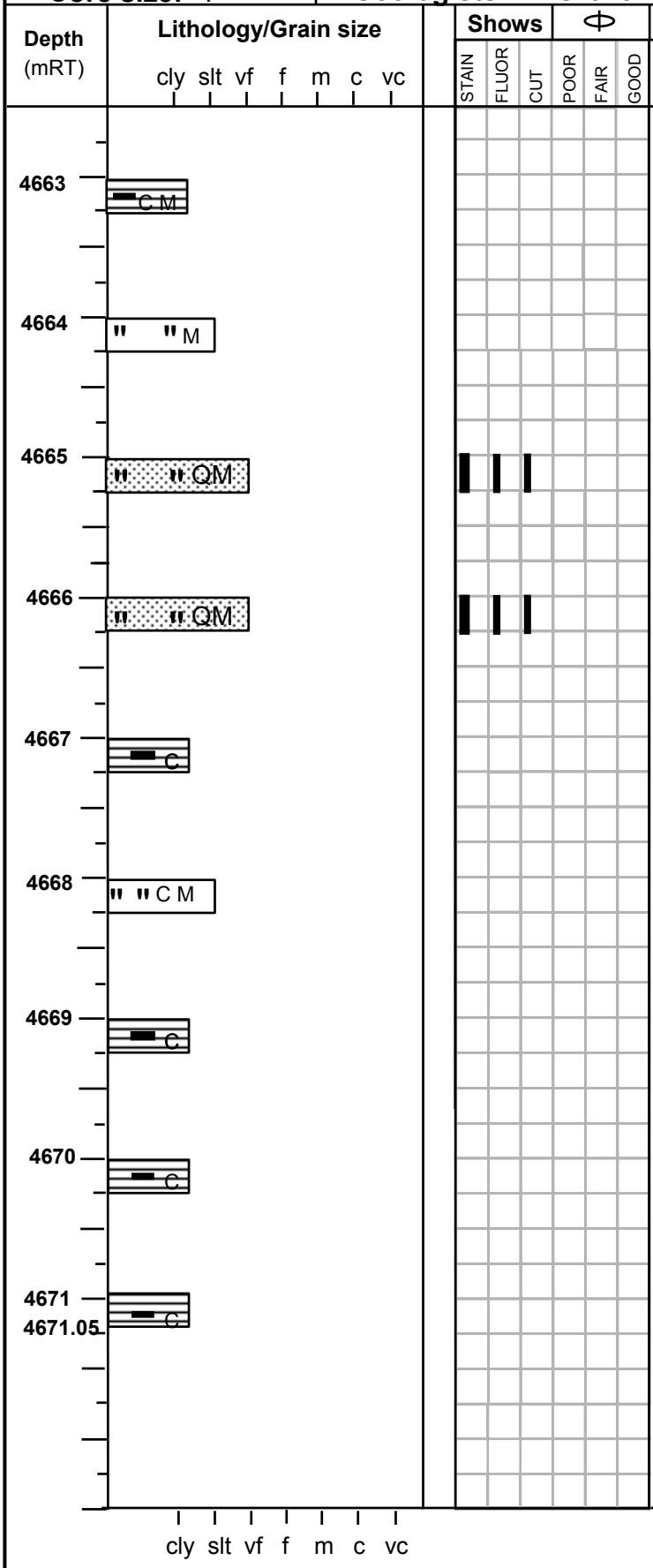
Country: Norway	**Area:** North Sea	**Field:** Gudrun
Well no: 15/3-7	**Formation:** Hugin Fm.	
Core no: 4	**Interval:** 4645 - 4671 m MD	**Cored:** 27m **Rec:** 25.8 m 92%
Core size: 4"	**Geologists:** T. Svånå / H. Høland	**Date:** 04.08.01



Shows			Lithological Description	Remarks
STAIN	FLUOR	CUT	Rock name, mod. lith., colour, grain size, sorting, roundness, matrix, cementation, hardness, sed. struct., accessories, fossils, porosity, contamination	Shows, etc.
			SST : dk gry, v f, wl srt, sbang - ang due to qtz overgrowth, wl sil cmt, hd, pr vis por	Strong Hc odour, spty yel wh fluor, mod - fast strmg wh cut, wh fluor resd.
			SST : a.a., Coal incl.	Shows a.a.
			SST : dk gry, v f, wl srt, sbang - ang due to Qtz overgrowth, wl sil cmt, hd, no vis por	Mod Hc odour, tr spty yel wh fluor, slow strmg weak bl wh cut, tr bl wh fluor resd.
			CLST : dk gry blk, sbfis -plty, hd, carb, sl micromic, sl slty, tr pyr, non calc.	
			CLST : gry blk, occ sml bivalves, else a.a.	
			CLST : a.a.	
			CLST : dk gry, else a.a.	
			CLST : com bivalves + brach, else a.a.	
			CLST : a.a.	
			SST : grad sdy Clst, gry blk, v f, pr - mod srt, sbang, wl sil cmt, hd, micromic, no vis por.	Mod Hc odour, tr spty yel wh fluor, slow strmg weak bl wh cut, tr bl wh fluor resd.

CONVENTIONAL CORE DESCRIPTION

Country: Norway	**Area:** North Sea	**Field:** Gudrun
Well no: 15/3-7	**Formation:** Hugin Fm.	
Core no: 4	**Interval:** 4645 - 4671 m MD	**Cored:** 27m **Rec:** 25.8 m 92%
Core size: 4"	**Geologists:** T. Svånå / H. Høland	**Date:** 04.08.01



Lithological Description

Rock name, mod. lith., colour, grain size, sorting, roundness, matrix, cementation, hardness, sed. struct., accessories, fossils, porosity, contamination

CLST : gry blk, sbfis -plty, mod hd - hd, carb, sl micromic, sl slty, non calc.

SLST : brn gry, sbfis, mod hd - hd, arg - v f sdy, carb, micromic, non calc.

SST : grad arg Slst, brn gry, v f, mod srt, sbang due to Qtz overgrowth, arg slty mtx, wl sil cmt, hd, sl micromic, no vis por

SST : a.a.

CLST : as 4663 sample, coaly lam.

SLST : as 4664 m sample.

CLST : gry blk, sbfis -plty, mod hd - hd, carb, sl micromic, sl slty, non calc.

CLST : a.a.

CLST : a.a.

Remarks

Shows, etc.

Mod Hc odour, tr spty yel wh fluor, slow strmg weak bl wh cut, tr bl wh fluor resd.

Shows a.a.

STATOIL

MSCT SIDEWALL CORE DESCRIPTION

Country: Norway	Area: Gudrun	Field: Pl 025 / PL 187
Well no: 15/3-7	Company: Statoil, Norsk Hydro, TotalFinaElf	
Hole size: 8 1/2 "	Geologist: P. Furmyr / J.E. Haugen	R.T.: 18 meters
Run no.: 3A	Reference log: Run 2A AIT-DSI & 3B IPLT-AIT	Date: 21.08.01

Shot no.	Depth (m RT)	Rec. (mm)	Lithological Description Rock name, mod.lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed.structures, accessories, fossils, porosity, contamination	Remarks Shows, cavings, mud additives, etc.
			Cores were only very briefly studied/analysed in order to handle the cores as little as possible, hence only a brief description is given below:	
1	4224	50	SST: (1 piece), brn gry, vf - f, w/clasts of Clst (bioturb?), sil cmt, mod hd	Mod HC odour even, dull, yel fluor w/slow, strm, yel wh cut
2	4226	40	SST: (1 piece, some crushing at one end), lam of blk, arg/carb&coaly mat, else a.a.	a.a.
3	4756.2	40	SST/SLTST: (2 pieces), olv gry, vf, wl cmtd, hd - v hd, sli arg, ti, no - pr vis por	Pr HC odour
4	4756	40	SST/SLTST: (2 pieces), a.a.	Mod HC odour
5	4755.3	40	SST/SLTST: (1 piece), a.a.	a.a.
6	4755.1	45	SST/SLTST: (2 pieces), a.a.	a.a.
7	4766.5	45	SST: (1 piece), brn gry, vf, wl cmt, hd - v hd, ti, no - pr vis por	a.a.
8	4765.6	45	CLST: (1 piece), brn blk, mod hd - hd,	No HC odour
9	4782.6	45	SST: (1 piece), olv gry - brn gry, vf - v crs, wl cmt, hd - v hd, ti, incl of wh, kao (??) mtrx	Mod HC odour wk, spty, dull, yel fluor
10	4782	40	SST: (1 piece), a.a.	a.a.
11	4778	45	SST: (3 pieces), vf - med - occ crs, else a.a.	a.a.
12	4776.4	45	SST: (1 piece), vf - f, wl cmt, hd, por vis por, else a.a.	a.a.
13	4775.5	45	SST/SLTST: (1 piece), olv gry - brn gry, vf, wl cmt, hd - v hd, ti, no- pr vis por	Pr HC odour
14	4775.3	45	SST: (1 piece), brn gry, vf - f, wl cmt, hd, pr vis por	Mod HC odour
15	4785.7	35	SST: (2 pieces), a.a.	Pr HC odour
16	4786.2	45	SST: (1 piece), bioturb, else a.a.	a.a.
17	4786.7	40	SST: (2 pieces), a.a.	a.a.
18	4791	30	SST: (2 pieces), no bioturb, else a.a.	a.a.
19	4794	40	CLST: (Crushed), brn blk, mod hd, sli slty, carb	No HC odour
20	4793.5	40	CLST: (1 piece), a.a.	a.a.
21	4779.5	40	SST: (1 piece), as 4782.6 m	Mod HC odour

App G List of available reports

Company	Report
BioStrat Ltd.	Biostratigraphy of well N15/3-7 (1200m-4774m)
CoreLab	Reservoir Fluid Study
Corpro	Core Photographs, Core1-4, White light/UV light, Sale 1:4
	Photographs of Thin Sections
	Conventional Core Analysis
Baker Hughes Inteq	End of Well Report, Directional Drilling and Surface Logging
	Definitive Survey
Elf	Casing Design Exploration
Fugro Survey AS	Site Survey at location 15/3-A for Statoil (STO199)
Read	Zero Offset VSP Processing Report
Schlumberger Drilling and Measurements	End of well report/Logs for Statoil, well number 15/3-7
	Seismic MWD Field Test Report, SMWD
Statoil ASA	Samtykkesøknad
	Well Programme Well 15/3-7, PL025/Pl187
Unknown	Navigation and Positioning Report

Enclosure Composite log 1:500

Enclosure Formation evaluation log 1:500 (Baker Hughes Inteq)

Enclosure Drilling data pressure log 1:500 (Baker Hughes Inteq)