



Varg Field

Well 15/12-16 S

END OF WELL REPORT

July 2006

WELL No. 15/12-16 S

END OF WELL REPORT

Approvals Sheet

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1.0 General Well data

1.0 EXECUTIVE SUMMARY

1.1 Results Overview

15/12-16 S was drilled between February and March 2006, utilizing the Maersk Giant jack-up rig.

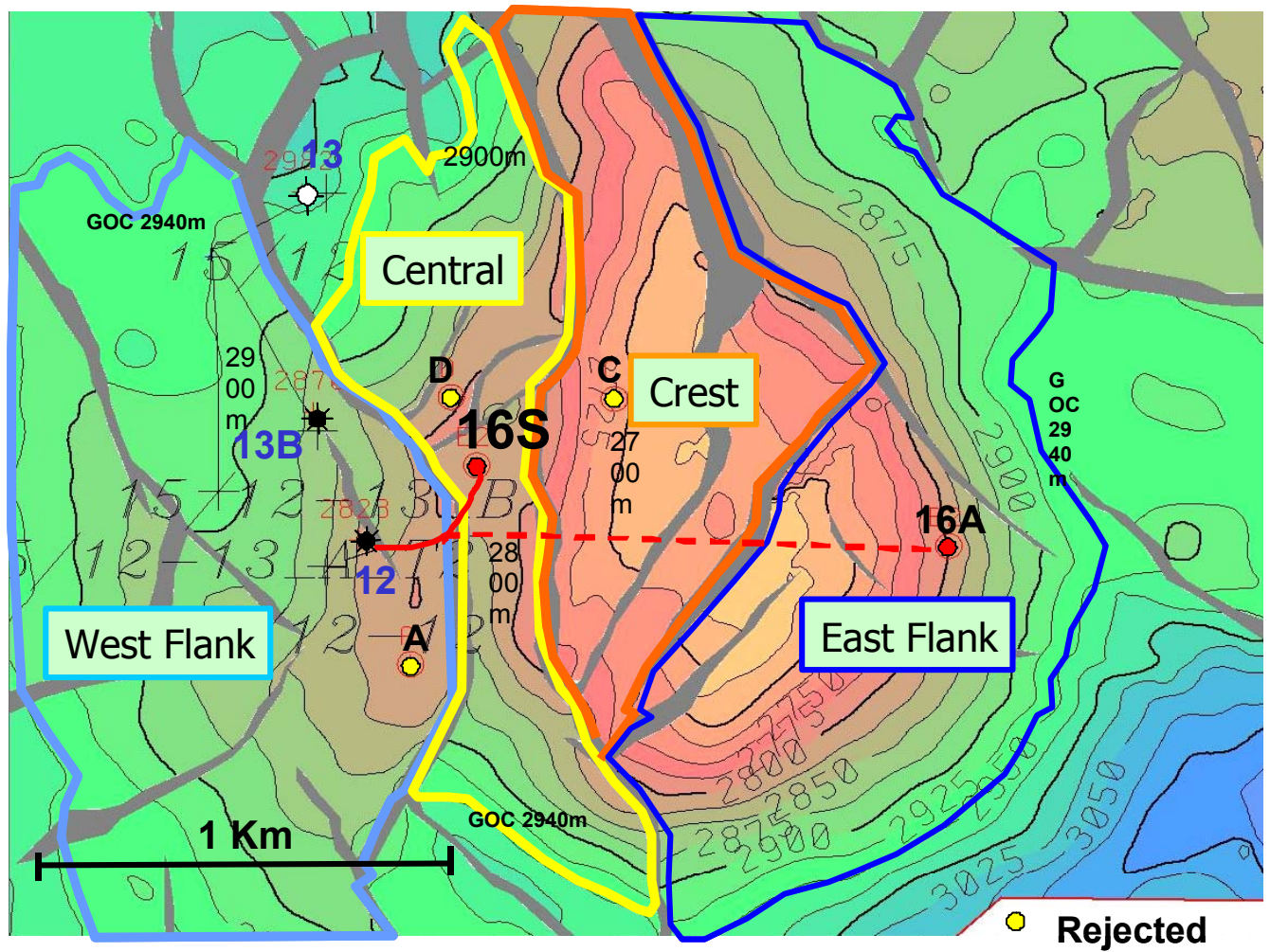
No major drilling problems or incidents occurred during the drilling of the upper sections.

The 8 ½" section was drilled in one bit run. The well encountered the top reservoir 70m high to prognosis and encountered a reservoir section thinner than predicted (83m MD vs. 130m). Preliminary interpretation indicates that the top of the reservoir section is faulted out and that RZ2 is very condensed. Reservoir quality is slightly poorer than was predicted but is still good.

The well was completed with a 7" liner across the reservoir and perforated at intervals 2850m to 2884m.

An extended testing program was carried out, with the main flow period flowing at a steady rate of 42MMscf/d.

1.2 Location Map



1.3 General Well Data

Operator Name	Talisman Energy Norge AS
Operator Address	Verven 4, Stavanger
Drilling Contractor	Maersk Contractors Norge
Installation Name	Maersk Giant (jackup)
Rotary Table Elevation	39.5m above MSL
Water Depth	87m MSL
Block	15/12
Licence	PL 038 C
Partners	Talisman Energy Norge AS: 70% Petro: 30 %
Platform Reference	NA
Location	
Slot Location	31 (N), CM3° East, ED-1950 58° 01' 40.393" N, 1° 55' 27.968" E 6 432 466.99m N, 436 472.16m E
Target Location	UTM N 64 326 56.82 m E 43 6711.30m Depth -2754 m TVDSS 2843 m MDBRT
Target Depth Uncertainty	±25m TVD
Target Horizon	Top Oxfordian Sandstone
Reservoir Target	Oxfordian Sandstone
Total Depth Driller	-2858m TVDSS (2961m MDBRT)
Well Type	Gas/condensate producer
Well Number	15/12-16 S
Prospect/Field Name	Rev
Start Date	Spud: 6 February 2006
TD Date	12 March 2006
Release Date	14 April 2006

1.3.1 Hole section and Casing summary

Hole size	36"	17 ½"	12 ¼"	8 ½"
Depth Interval	126.5 – 191.5m	191.5m – 1319m	1319m - 2835m	2835m - 2961m
Mud type	Sea water	Sea water/ KCl polymer	Performadril WBM	Baradril-N WBM
Mud weight	1.03 SG	1.03 – 1.07 SG	1.55-1.57 SG	1.10 SG
Casing Size	30"	13 3/8"	9 5/8"	7"
Hanger depth	-	-	-	2738.3m
Casing shoe	187m	1312.6m	2826m	2955m
FIT/LOT	NA	LOT: 1.80 SG @ 1322m	FIT: 1.20 SG @ 2839m	

1.4 Well History, Objectives and Results

1.4.1 Well History

3 wells have been drilled on the field, 15/12-12 and 15/12-13B (gas condensate) and one dry well 15/12-13. 15/12-13 A failed while in the Rogaland Formation. These 3 wells delineate the Western Flank of the field, while 15/12-16 S will seek to add proven reserves in the Central panel.

The selected well target is located within the Central Block, some 400m north-east of the suspended well 15/12-12. Criteria for its selection were:

- A potentially separate compartment from 15/12-12, adding proven reserves.
- Tests thick mapped reservoir section, similar looking signature to 15/12-12.
- Good elevation, correlation from 15/12-12 reliable, separated by only minor faulting.
- Faulting insufficient to completely displace the reservoir.
- More central N to S in the compartment than the alternative location. Penetrates possible flat spot coincident with the GOC.
- Should drain north-south length of Central Block.
- Avoids landing in thinned crestal area, but may drain it.
- Good elevation, slightly up-dip of 15/12-12.
- Avoids penetrating top reservoir horizon too close to any fault.
- Also tests upside potential in Upper Heather Formation (Kimmeridge age sands).

1.4.2 Well Objectives

Main Objectives:

Produce gas condensate from the Oxfordian reservoir in the Central panel.
Determine by DST whether surrounding faults form barriers to production

Determine a minimum connected gas volume
Obtain full flow gas samples.
Confirmation of good connectivity will allow drainage of the Western and Central areas with 2 wells, 15/12-12 and 15/12-16 S.

Secondary Objectives:

Acquire reservoir pressure data.
Acquire formation depths, cuttings, log and drill data for reservoir description and reservoir performance prediction.

1.4.3 Results

Well 15/12-16 S encountered top reservoir 70m high to prognosis and encountered a reservoir section thinner than prognosed (83m vs 130m). Preliminary interpretation indicates that the top of the reservoir section is faulted out and that RZ2 is very condensed. Reservoir quality is slightly poorer than was prognosed but is still good. The well was completed with a 7" liner across the reservoir and perforated at intervals 2850m to 2884m.
An extended testing program was carried out, with the main flow period flowing at a steady rate of 42MMscf/d.

1.5 Final Well Classification

Suspended as a Varg South gas producer.

2.0 Performance Summary

2.1 Health, Safety and the Environment

HSE summary

	15/12-16 S
LTI	0
MTI	1
First aid	5
Accidental discharge	1
Dropped objects	2
H2 Value (per 01.05.2006)	7.8

A total of 1 medical treatment incident was reported (ref synergy #64092): When lowering the pipe down to some wooden pies on the grating, one pipe rolled off and down towards deck. The pipe made an upward movement, again hitting a person finger. This resulted in a medical treatment. The incident was assessed to have a low potential.

A total of 5 first aid incidents were reported (ref synergy reports #63619, #64386, #64417, #64470, #65554): One hit long finger, one scratch on long finger, one cut in left ring finger, one twisted ankle and one punctured skin on finger. These incidents were assessed to have a low potential.

A total of 2 dropped objects (with a higher impact force than 40 J) were reported (ref synergy reports #63604 and #64793):

#63604: While picking up and running 13 3/8" casing, 2 ea bolts (10 mm) was found on the rig floor beneath the PLS (pipe pickup laydown system). The operation was suspended and the PLS was checked. Checking the PLS revealed that a hinge pin locking plate had been sheared off at the two bolts. The locking plate was then also found on the rig floor beneath the PLS. The bolts and the locking plate weighed together 0,7 kg, and they fell down from 8 meters. The impact of the parts combined is then 54 Joule. This incident was reported to the PTIL and investigated by Talisman/DPT/Mærsk. Loss potential: seriously person injury.

#64793: When taking onboard cargo from boat "Rem Fortune", a door covel fell off an Odfjell electric power unit and landed down on the deck of the supply vessel. The weight of the door was 32 kg (153x75 cm) and estimated drop height was 5-7 m. Estimated force impact: 1568-2195 Joules. This incident was reported to the PTIL and investigated by Maersk. Loss potential: seriously person injury.

A total of 1 accidental discharge to sea was reported (ref synergy report #64518): A leakage from dump valve #2 was detected during a displacement job, again resulting in oil based mud discharge to sea. This incident was reported to the PTIL.

SUMMARY of INVESTIGATION REPORTS.

Mini investigation RUH #63604: Dropped object from PLS

While picking up and running 13 3/8" casing, 2 ea bolts (10 mm) was found on the rig floor beneath the PLS (pipe pickup laydown system). The operation was suspended and the PLS was checked. Checking the PLS revealed that a hinge pin locking plate had been sheared off at the two bolts. The locking plate was then also found on the rig floor beneath the PLS. The area below the PLS was fenced off for personnel not involved in the operation, but there was personnel working on the rig floor at the time of the incident. Prior to starting running casing a pre-job meeting was held with the involved personnel. At this meeting it was highlighted that nobody should walk underneath moving machinery, PLS included. The bolts and the locking plate weighed together 0,7 kg, and they fell down from 8 meters. The impact of the parts combined is then 54 Joule. Recommended actions: further investigation (engineering department), consultations with Varco about possible historical problems with locking plates, put out a safety alert (Varco)

Mini investigation RUH #64092: Finger hit by a pipe.

During lowering 2 ea 6" (9 m long) pipes (for the well testing unit) to wooden piles on the grating, one of the pipes rolled off the grating, and down towards the deck on the opposite side of the pipe of where the injured person was standing. This resulted the pipe hitting upwards at the end where the injured was trying to retreat. The pipe hit his finger in an upward movement. Injured person was steering pipes with hands (pipes +/-10 cm above grating) just prior to landing pipes, pipes was then under his hands. Injured person did not steer during the main lift. Person contacted medic after 18,5 hrs, ended up as medical treatment (long finger was in pain, had swelled). Recommended actions: more focus on falling objects during lifting operations, secure landing area with anti rolling barriers, contact medic, even with small "innocence" injuries even if medic is sleeping.

Mini investigation RUH #62959 Sea fastening on pipe lifting machine.

A person was asked to remove sea fastening pin on top of the pipe lifting machine (after sailing from Hummer to Varg S). Later during testing the pipe lifting system, was not able to move. Found out that sea fastening pin was not removed. Long term actions: update rig move procedure.

Mini investigation: Mud line running tool not recovered when pulling 9 5/8" surface hanger.

The MLH (mudline hanger) running tool was planned to be released with a spear, and casing pulled to surface in the same operation. The spear slipped, and it was necessary to run the torque tool to release the MLH running tool from the MLH. When pulling out with the 9 5/8" surface casing after releasing MLH running tool with 11 RH turns, the MLH running tool was not attached to the casing. When rotating free the MLH running tool with the torque tool, the connection above had been backed out at the same time.

Recommended actions: Avoid using torque tool, if possible, to release MLH running tool when pulling 9 5/8" surface casing. It is not possible to observe if the casing rotates, or if it is being backed out above the MLH running tool.

Evaluate different means for fishing a MLH running tool. The running tool is only 68 cm, and the slips segments on the inline spear used on this job was 39 cm. Not much room to play with. An Itco spear could not have done the job, due to the high torque required. The surface casing handling tool should always be onboard. Even if it is not used for pulling with, it is to be used as handling joint for the surface hanger.

When using the torque tool, and the depth to the rotating profile is known exactly (i.e. after the first run with the torque tool), it should be evaluated to take off the locating dogs. This to avoid the MLH running tool to be forced upwards into the shoulder on the locating dogs when being rotated out. It can be difficult to balance the string weight exactly and avoid that to happen, when the locating dogs installed.

Maersk investigation report RUH #64793: Cover plate fell off OWS Power unit and down on supply boat.

The 17.03.06 at approx. 23:00 hrs during a lift from a supply vessel, a cover plate fell of a load carrier and landed down on the deck of the supply vessel. The weight of the cover was 32 kg and the drop height approx 5-7 m (2200 Joule). The personnel on the deck of the supply vessel was positioned in a safe area and there were no personnel close to where the cover landed.

The potential consequence could have been serious personnel injury with permanent disabling if cover had hit personnel either on the supply vessel or on deck on "Maersk Giant".

The locking wedge holding the cover in place on the load carrier had opened, which again led to the cover plate coming loose in the upper part and thereafter fell down on the deck on the supply vessel. The wedge had not been put properly in place or they have been influenced by an outer force. The lower end of the cover was only fastened by two pins sticking up.

Lack of check of the equipment before shipment from the base and poor design of the locking mechanism may be mentioned as basic causes.

Immediate action was to secure the locking wedges before the load carrier was to be lifted further. The incident is to be experienced transferred to relevant parties

(especially OWS and ASCO base), and they are recommended to go through their routines for checking out equipment before sending it offshore. OWS is also recommended to evaluate the design of the locking mechanism.

Investigation report “erroneous test data from Varg S well test”

A serious incident occurred on the recent Varg South well test when the flowrate data submitted by the testing contractor on the rig was later found to be higher than the actual flowrate measured by approximately 20%.

An incident such as this must be considered to have one of the highest potential consequences of all the risks evaluated for the project and, as such, the scope of this investigation has included in depth reviews of both the Contractor and Talisman Energy Norge AS management systems and processes.

Fortunately in the circumstances of this less marginal well the decision not to sidetrack stands firm even with the reduced flow data but due to the marginal nature of many of the wells in the future TENAS drilling programme, it is imperative that all well data is as accurate as possible. This is particularly important as some forthcoming wells have sidetrack options should the main bores not prove to have commercial reserves and high impact commercial decisions will have to be made quickly and on the basis of field well test data.

As a consequence of the above, this investigation has summarised the event, identified the root causes and implemented a remedial work plan to ensure that future well test data is accurate and that the risk of reoccurrence of this incident is reduced as much as possible.

The investigation concludes that the failure was initially caused by human error during the operation of the Data Acquisition System (DAS) by PowerWell Services technicians offshore. As the operation of the DAS system is reasonably complex in nature such errors are fairly common and, with this in mind, steps that would indicate that an error existed were identified and included in the Well Test Programme under the Data Acquisition - Section 13.

In this case, however, the barriers put in place to prevent an incident such as this all failed.

The Root causes have been identified as shortfalls in primarily the PowerWell Services Quality Management System but also bring to light some improvements that can be made to the TENAS steering documentation, Risk assessment process and the job description Roles and Responsibilities of TENAS Supervisory personnel for future operations.

2.2 Cost Analysis

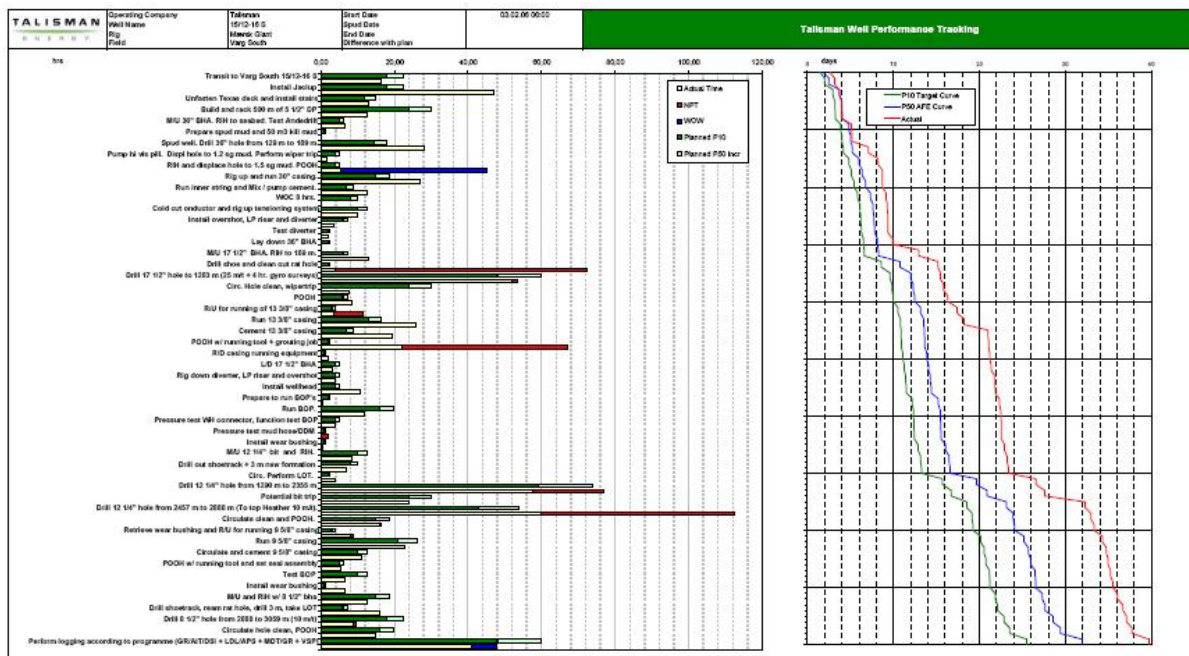
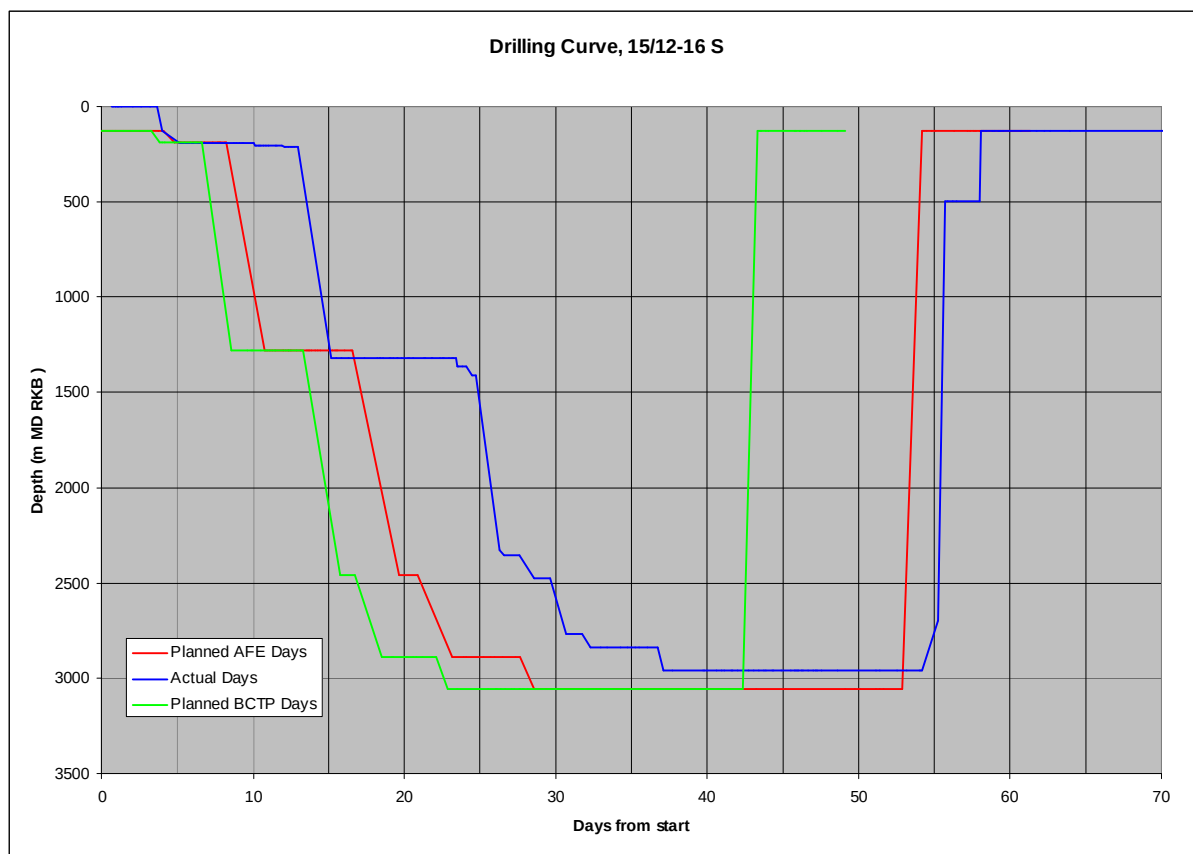
Section 2.2 Cost Analysis

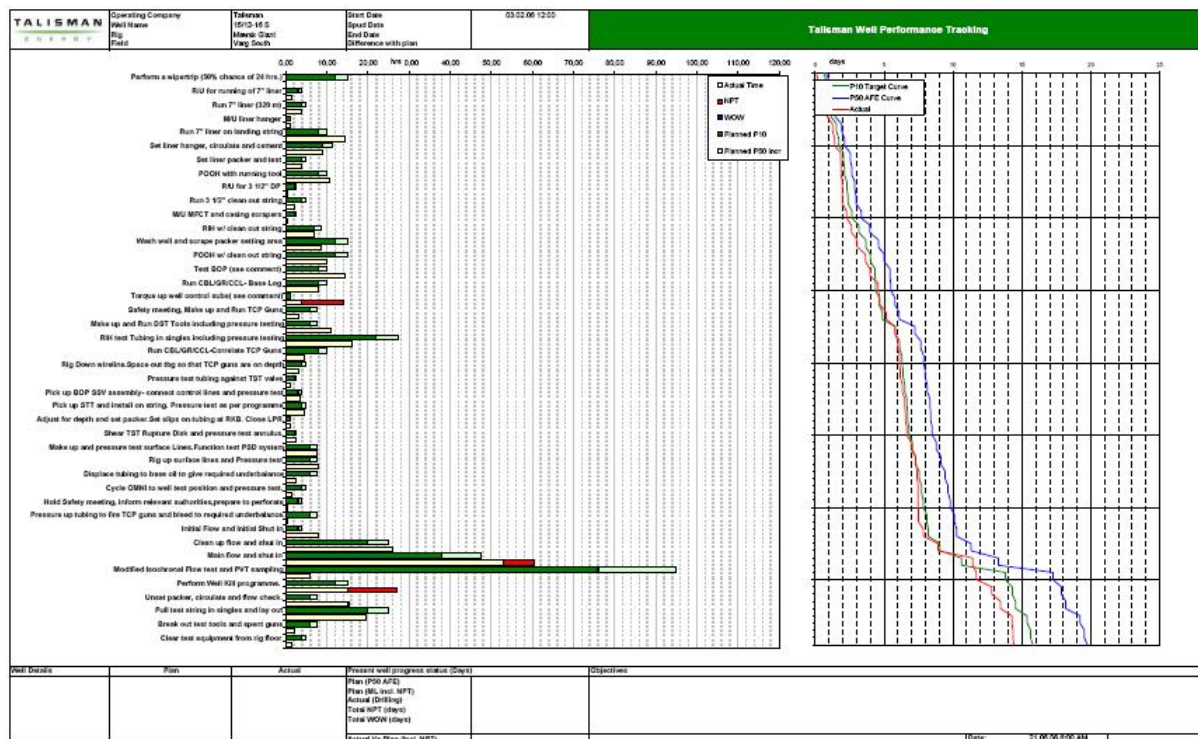
Varg 15/12-16 S Cost Analysis

	AFE		FINAL COST ESTIMATE		AFE - FINAL	
	Cost [MNOK]	Days	Cost [MNOK]	Days	Cost [MNOK]	Days
Drilling (incl. transit)	130.799.292	44	160.412.525	52	-	-
Well testing (incl. Liner)	77.400.976	17	77.511.987	16	-	-
WOW cont. (incl. rig move)	19.325.137	7	10.117.228	4	-	-
TOTAL WELL	227.525.405	68	248.041.740	72	-	-

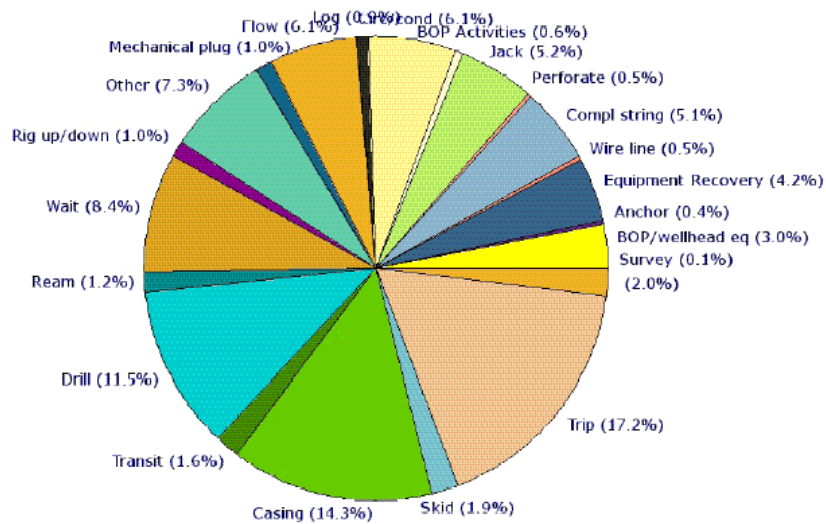
2.3 Performance Trackers

2.3.1 Performance Trackers

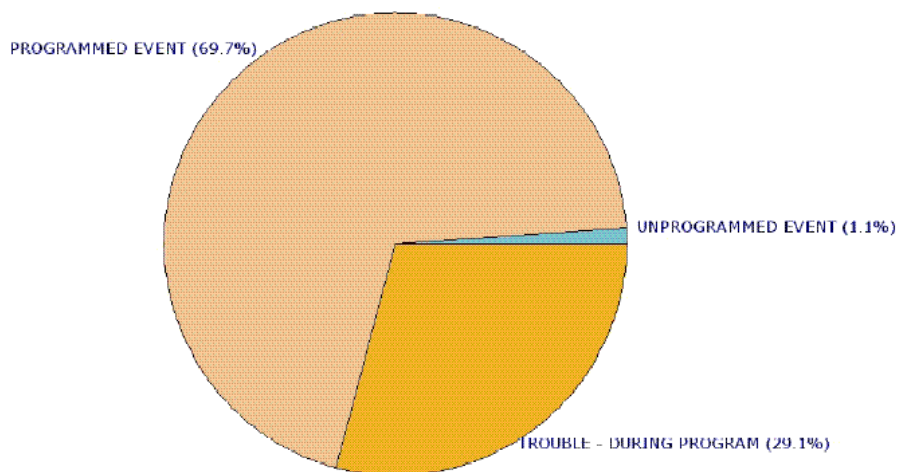




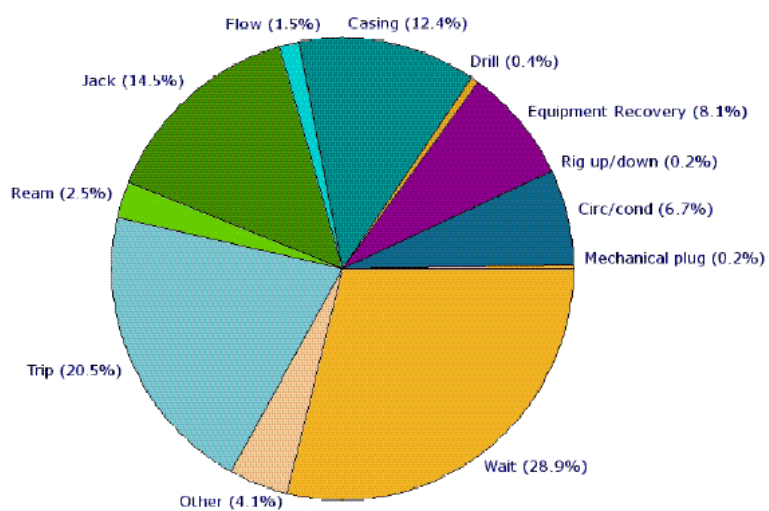
Time Analysis by Operational Code (% of 1702.5 hrs)

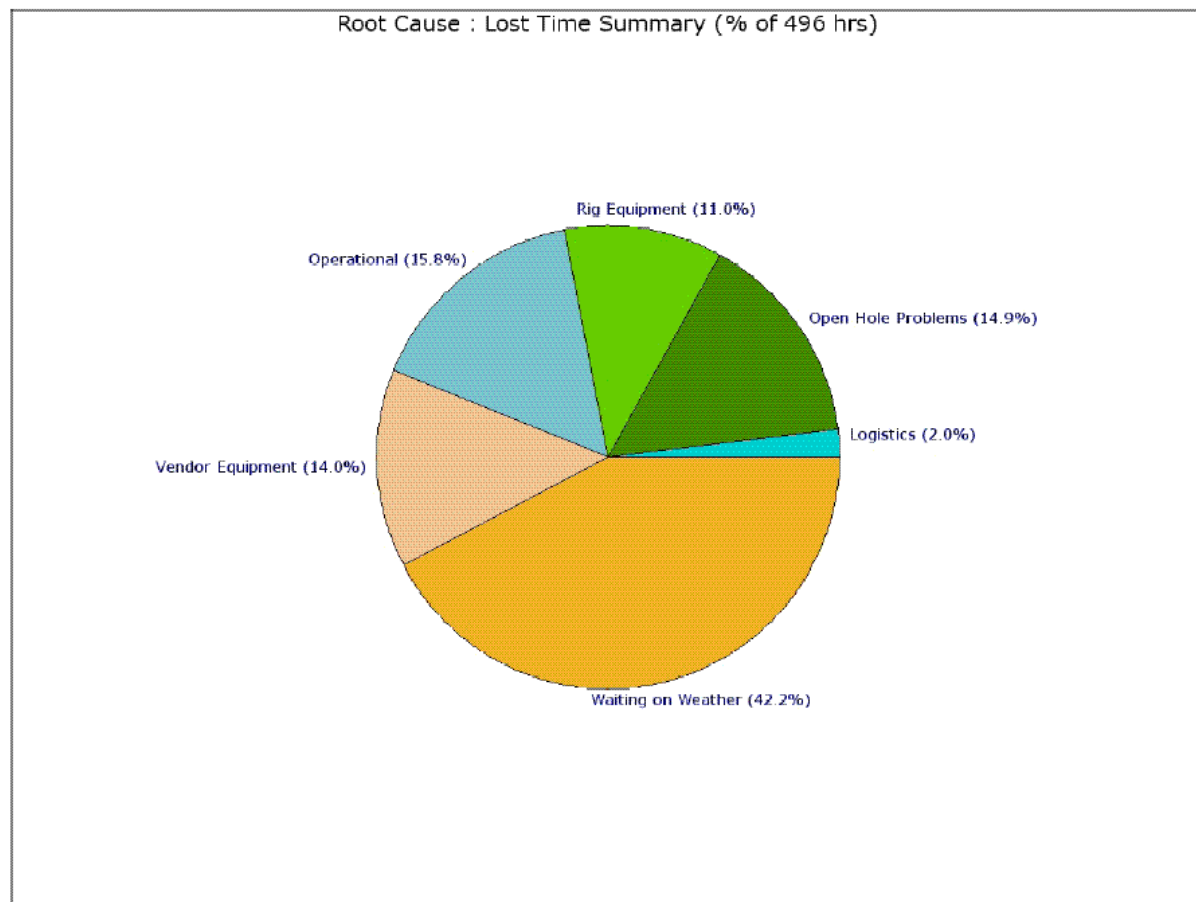


Time Analysis by Class Codes (% of 1702.5 hrs)



Drilling : Lost Time Summary (% of 495.5 hrs)





3.0 Formation Tops

3.0 FORMATION TOPS

3.1 Stratigraphic Table

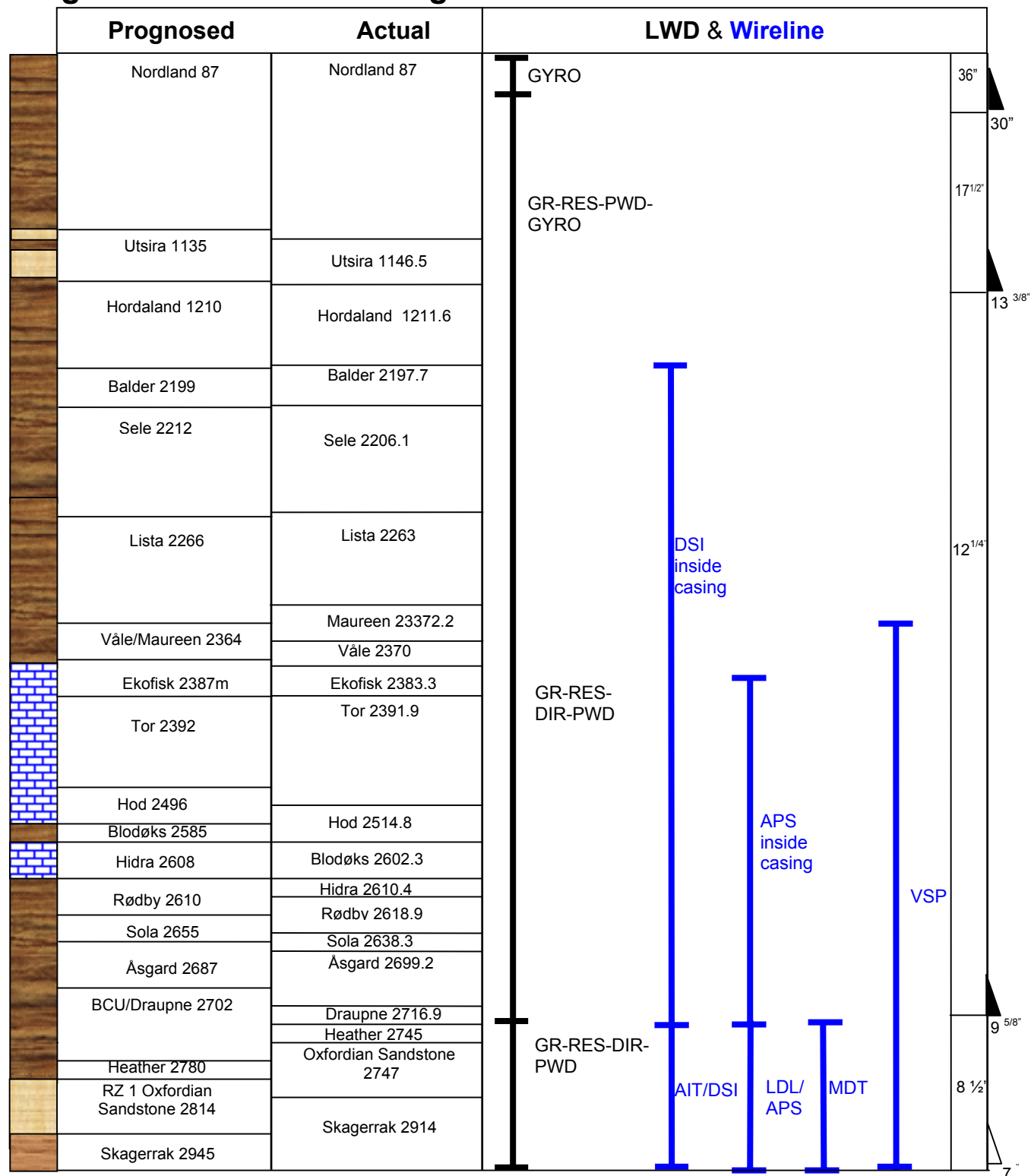
15/12-16 S	TOPS		THICKNESS		SEISMIC
	MD BRT	TVD SS	MT	AVT	TWT
Nordland Group	126.5	87	1124.6	1124.6	
<i>Utsira Formation</i>	<i>1192.7</i>	<i>1146.5</i>	<i>66</i>	<i>64</i>	
Hordaland Group	1259	1211.6	1000	986.10	
<i>Green Claystone Marker</i>	<i>2050</i>	<i>1991</i>	<i>-</i>	<i>-</i>	
Rogaland Group	2259	2197.7	190	187	
<i>Balder formation</i>	<i>2259</i>	<i>2197.7</i>	<i>8.5</i>	<i>8.4</i>	
<i>Sele Formation</i>	<i>2267.5</i>	<i>2206.1</i>	<i>57.8</i>	<i>56.9</i>	
<i>Lista Formation</i>	<i>2325.3</i>	<i>2263</i>	<i>110.5</i>	<i>109.2</i>	
<i>Maureen Formation</i>	<i>2435.8</i>	<i>2732.2</i>	<i>18</i>	<i>17</i>	
Shetland Group	2447	2383.3	245.7	235.6	
<i>Ekofisk Formation</i>	<i>2447</i>	<i>2383.3</i>	<i>8.7</i>	<i>8.6</i>	
<i>Tor Formation</i>	<i>2455.7</i>	<i>2391.9</i>	<i>126</i>	<i>122.9</i>	
<i>Hod Formation</i>	<i>2581.7</i>	<i>2514.8</i>	<i>92.9</i>	<i>87.5</i>	
<i>Blodøks Formation</i>	<i>2674.6</i>	<i>2602.3</i>	<i>8.8</i>	<i>8.1</i>	
<i>Hidra Formation</i>	<i>2683.4</i>	<i>2610.4</i>	<i>93</i>	<i>8.5</i>	
Cromer Knoll Group	2692.7	2618.9	2690	2616	
<i>Rødby Formation</i>	<i>2692.7</i>	<i>2618.9</i>	<i>21.8</i>	<i>19.3</i>	
<i>Sola Formation</i>	<i>2714.5</i>	<i>2638.2</i>	<i>67.1</i>	<i>60.9</i>	
<i>Åsgard (Valhall) Formation</i>	<i>2781.6</i>	<i>2699.2</i>	<i>27</i>	<i>24</i>	
Viking Group	2801.6	2716.9	110	105	
<i>DraupneFormation</i>	<i>2801.6</i>	<i>2761.9</i>	<i>32.7</i>	<i>29</i>	
<i>Heather/Kimmeridgian Sst</i>	<i>2834.3</i>	<i>2745.9</i>	<i>1.1</i>	<i>1.1</i>	
<i>Oxfordian Sandstone (RZ1)</i>	<i>2835.5</i>	<i>2747.0</i>	<i>39.9</i>	<i>35.2</i>	
<i>RZ2</i>	<i>2875.4</i>	<i>2782.2</i>	<i>5.4</i>	<i>4.9</i>	
<i>RZ3</i>	<i>2880.8</i>	<i>2787.1</i>	<i>30.3</i>	<i>26.6</i>	
Triassic (Skagerrak)	2914.0	2816.2	48.5	42.6	
TD	2962.5	2858.8			

3.2 Biostratigraphic Table

Non carried out.

3.3 WELL SUMMARY DIAGRAM

Rev 15/12-16 S Formation Tops Prognosed vs. Actual & Logs



Fm. tops in m TVDSS.
Figure is not to scale

4.0 Stratigraphy

4.0 STRATIGRAPHIC EVALUATION

4.1 Lithostratigraphic Summary

The following lithostratigraphy is based on drilled cuttings and LWD logs. Wellsite Geological monitoring began at 191m.

4.1.1 NORDLAND GROUP (Quaternary)

126.5 to 1259m (87 to 1211.6m TVDSS)

The Nordland Group comprises interbedded claystones, thin sands and rare limestone stringers with sand units/beds belonging to the Utsira Formation in its lowermost part.

CLAY/CLAYSTONE: medium grey to medium dark grey, also light olive grey in colour, soft to firm, very soft and sticky in parts, sub-blocky to occasionally blocky, occasionally amorphous, very silty and sandy in parts, locally micaceous, locally pyritic, occasional fine dark grey to black argillaceous or carbonaceous streaks/micro-laminations, non to moderately calcareous, common shell fragments, common well preserved microfossils.

SAND: loose quartz grains, transparent, translucent, occasionally opaque/white, generally fine to medium grained, occasionally coarse grained, sub-angular to sub-round, occasionally angular, moderate sphericity, poorly to well sorted.

LIMESTONE: cream to very light grey, soft to firm, mudstone to wackestone, sub-blocky, speckled in parts, micaceous in parts.

Utsira Formation

1192m to 1262m (1146m to 1214m TVDSS)

The top of the Utsira was picked at the first downward gamma ray drop in conjunction with increased ROP and lithological changes in cuttings samples. The Utsira Formation is comprised of interbedded sand and clay/claystone.

SAND: loose quartz, colourless, translucent, very fine to medium grained, occasionally very fine, sub-round to round, sucrosic in parts, moderately sorted, trace carbonaceous specks, trace pyrite. No shows.

CLAYSTONE: medium grey, light greenish grey, occasionally light brownish grey, very silty soft to firm, sub-blocky to blocky, non calcareous.

4.1.2 HORDALAND GROUP (Tertiary)

1259m to 2259m (1211.6m to 2197.7m TVDSS)

The top of the Hordaland Group was picked at an unconformity below the base of the Utsira Formation. Gamma ray values shift to the right and level out, compared to values for the Utsira sands. Gamma ray values are lower and more uniform than those associated with the overlying Nordland Group. The deep and shallow resistivity values both increase slightly and level out in relation to the Utsira sands. The top

Hordaland was picked at the maximum gamma ray spike, just below the lowermost Utsira sand.

The Hordaland is a massive Claystone sequence. Increasing amounts of limestone and dolomitic limestone stringers are observed with depth.

CLAYSTONE: medium brownish grey and occasionally greenish grey in colour at the top, becoming dominantly brown black with depth, occasionally medium dark grey to dark grey in colour, firm to occasionally moderately hard, sub-blocky to blocky, slightly micromicaceous, non to slightly calcareous.

Below 2050m (1991m TVDSS) the “Green Claystone” marker appears.

The claystone was dark green grey to green grey, occasionally olive black in colour, firm to moderately hard, sub-blocky, slightly silty, occasionally calcareous, occasionally micromicaceous, and non calcareous. The sporadically appearing limestone was commonly dolomitic.

LIMESTONE: brown grey, dark yellow brown, and buff in colour, blocky, moderately hard to hard in places, rare argillaceous streaks, microcrystalline, dolomitic.

4.1.3 ROGALAND GROUP (Tertiary)

2259m to 2445m (2197.7m to 2383.3m TVDSS)

The top of the Rogaland is picked at the top of the Balder Formation, where a sharp gamma ray spike is observed in conjunction with a rise in the resistivity readings.

Balder Formation

2259m to 2267.5m (2197.7m to 2206.1m TVDSS)

A distinctive gamma ray spike identified the top of the Balder Formation. The resistivity response over the Balder Formation was the characteristic bell shaped profile. The Balder consisted of tuffaceous claystone.

TUFFACEOUS CLAYSTONE: medium blue grey, grey green, medium dark grey in colour, traces of white and black speckled, firm, crumbly, sub-blocky, occasionally calcareous.

Sele Formation

2267.5m to 2325.3m (2206.1m to 2263m TVDSS)

The top of the Sele Formation was picked at the maximum reading of a gamma ray feature. The exact pick was made where the resistivity readings level out after decreasing from the characteristic “bell-shape” in the Balder. The Sele was a claystone.

CLAYSTONE: olive grey to medium dark grey, occasionally brownish black to brownish grey, moderately hard, sub-blocky to blocky, silty, non calcareous.

Lista Formation

2325.3m to 2435m (2263m to 2372.2m TVDSS)

The top of the Lista was picked at the top of a downward trending gamma ray spike. The formation consisted of claystone with occasional thin stringers of limestone and rare stringers of dolomitic limestone. Two thin siltstone stringers were also present.

CLAYSTONE: medium grey to olive grey, also medium bluish grey, moderately hard, homogenous, sub-blocky, non calcareous.

LIMESTONE: off white, moderately hard, angular, microcrystalline, argillaceous laminations.

DOLOMITE: brownish grey, blocky, hard to very hard, angular break, microcrystalline.

DOLOMITIC LIMESTONE: brownish grey, blocky, hard to very hard, angular break, microcrystalline.

SILTSTONE: dark yellowish brown to pale yellowish brown, firm to moderately hard, blocky, rarely sandy, non calcareous.

Maureen Formation

2435.8m to 2447m (2372.2m to 2383.3m TVDSS)

The top of the Maureen Formation was picked at the rise of a characteristic gamma ray “bulge”, accompanied by a slight decrease in the resistivity trace. The formation consisted of marl grading to calcareous claystone.

MARL: light grey to medium grey, soft to firm, amorphous to sub-blocky, grading to calcareous claystone.

4.1.4 SHETLAND GROUP (Lower Palaeocene-Upper Cretaceous)

2445m to 2692.7m (2383.3m to 2618.9m TVDSS)

The top of the Shetland Formation is picked at a downward decrease in the gamma ray accompanied with a rise in resistivity.

Ekofisk Formation

2447m to 2381m (2454m to 2390m TVDSS)

The top of the Ekofisk Formation is picked at a downward decrease in the gamma ray accompanied with a rise in resistivity, reflecting the change to a limestone sequence.

LIMESTONE: yellowish grey, firm to moderately hard, cryptocrystalline.

Tor Formation

2455.7m to 2581.7m (2391.9m to 2514.8m TVDSS)

A consistently low gamma ray reading of around 15 API marked the top of the Tor Formation, reflecting its less argillaceous nature. The formation is a thick sequence of limestone.

LIMESTONE: off-white to very light grey to yellowish grey to pinkish grey, firm, locally moderately hard, blocky, brittle, clean, chalky, mudstone texture, micro to cryptocrystalline.

Hod Formation

2581.7m to 2674.6m (2514.8m to 2602.3m TVDSS)

A slightly increasing gamma ray reading, accompanied by a marked drop in the resistivity marked the top of the Hod Formation, reflecting its more argillaceous nature. The formation consisted predominantly of limestone with an increasing amount of marl towards the base of the sequence.

LIMESTONE: off-white to very light, firm, locally moderately hard, blocky, brittle, clean, chalky, mudstone texture, micro to cryptocrystalline.

- with fair traces of

MARL: light grey, locally medium grey, soft to firm, sub-blocky to amorphous, very slightly micro-carbonaceous speckled, rarely bonded with limestone.

Blødøks Formation

2674.6m to 2683.4m (2602.3m to 2610.4m TVDSS)

The top of the Blødøks Formation was picked at a marked increase in gamma ray response, allied to an increase in resistivity and a decrease in penetration rate. These changes reflect the change in lithology from the clean limestones of the Hod formation, to red brown marl.

LIMESTONE: off-white to very light, firm, locally moderately hard, blocky, brittle, clean, chalky, mudstone texture, micro to cryptocrystalline, becoming pale red to pale reddish brown, firm to moderately hard, slightly argillaceous, locally very argillaceous and grading to marl.

Hidra Formation

2683.4m to 2690m (2613m to 2613m TVDSS)

The top of the Hidra Formation was not an obvious pick. The top was chosen at the start of a constant gamma ray feature, which was also reflected in a steady resistivity trace. The Hidra was seen as a continuation of the red brown marl seen in the overlying Blødøks.

MARL: pale red to pale reddish brown, firm to moderately hard, sub-blocky, variably argillaceous and locally grading to limestone.

4.1.5 CROMER KNOLL GROUP (Lower Cretaceous)

2692.7m to 2801.6m (2618.9 to 2716.9m TVDSS)

The Cromer Knoll Group is divided into three formations in this area. The top of the Cromer Knoll Group was picked at a slight increase in the gamma ray response below the Hydra, followed by a section of steady gamma ray readings, a distinctive downwards shift in resistivity was also noted.

Rødby Formation

2692.7m to 2714.5m (2618.9m to 2638.3m TVDSS)

MARL: moderate brown to olive black to olive grey, soft to firm, locally moderately hard, amorphous to sub-blocky, grading in part to argillaceous limestone.

- interbedded with

LIMESTONE: light grey, firm to moderately hard, sub-blocky, angular, microcrystalline, commonly argillaceous and grading to marl.

- with interbeds of

SANDSTONE/SANDY LIMESTONE: light grey to off white, translucent quartz grains, very fine to fine, sub-rounded, often loose, also with abundant white calcareous matrix, soft to friable, common argillaceous streaks, glauconite, poor visible porosity, NS.

Sola Formation

2714.5m to 2781.6m (2638.3.2m to 2699.2m TVDSS)

Top of the Sola Formation is picked on an increase in the resistivity accompanied by a decreasing gamma into a more limy sequence compared to the more marly Rødby Formation.

The Sola Formation comprises interbedded limestones and calcareous claystones, which locally grade into a marl.

LIMESTONE: light grey to light olive grey, soft to firm, amorphous to sub-blocky, common argillaceous laminations, microcrystalline, locally very finely sandy.

- interbedded with

CLAYSTONE: olive black to olive grey, dark grey, occasionally red brown, soft to firm, occasionally moderately hard, amorphous to sub-blocky, traces of carbonaceous material, silty, strongly calcareous and grading to marl.

- trace of marl

MARL: red brown, firm, sub-blocky, grading to claystone.

Åsgard Formation

2781.6m to 2801.6m (2699.2m to 2716.9m TVDSS)

The top of the Åsgard Formation is picked at the onset of a trend towards generally higher gamma readings and generally lower resistivity readings compared to the overlying Sola Formation.

The Åsgard Formation comprises interbedded claystones, marls and limestones.

CLAYSTONE: olive black to brown black, dark grey, firm to occasionally moderately hard, sub-fissile, occasionally blocky, slightly micro-micaceous, slightly silty, non calcareous.

- interbedded with

MARL: greyish red to moderately brown, minor pale red brown to light brown, firm to moderately hard, in parts micro-micaceous, very argillaceous and locally grading to a calcareous claystone which occasionally grades to limestone.

- interbedded with

MARL grading to Claystone: very light grey, soft to firm, amorphous to sub-blocky, in parts micro-micaceous, very argillaceous and locally grading to a calcareous claystone.

-interbedded with

LIMESTONE: yellowish grey to medium light grey, locally white, firm to moderately hard, blocky, microcrystalline, locally slightly argillaceous.

4.1.6 VIKING GROUP (Upper Jurassic)

2801.6m to 2914.0m (2716.9m to 2816.2m TVDSS)

Draupne Formation

2801.6m to 2834.3m (2716.9m to 2745.9m TVDSS)

The top of the Draupne Formation was picked at an abrupt increase in the gamma ray with readings increasing by 100api up to 330api. There is an obvious change in cuttings from marl and limestone to a carbonaceous claystone with rare traces of limestone.

CLAYSTONE: olive black to olive grey, soft to firm, blocky to sub-fissile, earthy, crumbly surface texture, slightly micro-micaceous, trace of carbonaceous material, slightly silty becoming more silty below 2820m, minor disseminated micro-pyrite, non to slightly calcareous, rare traces of pyrite nodules.

- with local thin stringers or lamina of

LIMESTONE: off-white to very light grey, firm to moderately hard, blocky, traces of argillaceous material, microcrystalline.

Heather Formation

2834.3m to 2843m (2745.9m to 2747m TVDSS)

The top of the Heather Formation was picked on the abrupt decrease in the gamma ray with readings decreasing from 195API down to 30API. There is an obvious change in cuttings from silty claystones to sandstone.

SANDSTONE: light brownish grey to medium grey, clear to translucent quartz grains, very fine to fine, well sorted, sub-angular, abundant calcareous cement/matrix, locally slightly argillaceous matrix, trace glauconite, no visible porosity, no shows.

Oxfordian Sandstone

2835.5m – 2914m (2747m – 2816.2m TVDSS)

The Oxfordian Sandstone was picked at the base of a “fining upward” sequence, seen on the gamma ray as a steady downward trend. A sharp increase in the resistivity is observed in the gas filled reservoir top. The formation consists of sandstone.

SANDSTONE: light to medium grey, medium to dark grey, occasionally brownish grey cuttings, firm to hard cuttings, blocky to sub-blocky cuttings, dark argillaceous matrix, slightly calcareous cement, transparent to translucent grains, occasionally milky white, fine to medium grained, occasionally coarse grained, sub-round to sub-angular, moderate to well sorted, trace glauconite, trace pyrite, micro-micaceous, poor visible porosity, no shows.

4.1.7 HEGRE GROUP (Triassic)

2914.0m – 2962.5m (2816.2m – 2858.8m TVDSS-TD)

Skagerrak Formation

2914.0m – 2962.5m (2816.2m – 2858.8m TVDSS-TD)

The Skagerrak Formation was difficult to pick from LWD logs due to a lack of correlation with surrounding wells. Indications were that the upper part of the formation consisted of low resistivity sands. A sharp increase in gamma ray at 2953m MD suggested entry into Triassic claystones. The claystones were medium to dark grey (commonly associated with very fine disseminated pyrite) and red/brown, soft, sub-round to sub-blocky cuttings.

4.2 Key Findings and Differences From Prognosis

There were some differences between the actual and prognosed formation tops from the drilling programme.

The Hordaland Group was 4m deeper and the Rogaland Group 5m shallower than prognosed. The Shetland Group / top Ekofisk Formation came 6m shallower than the prognosis.

The Cromer Knoll Group came 6m deeper and the BCU 12m than was prognosed.

The top of the Oxfordian sandstone reservoir, came in 60 m shallower than prognosis due to a much thinner and condensed lower part of the Draupne and an absent package of Heather siltstones below the Draupne. Only a thin, ca 5m MD, thick siltstone bed separated the Heather sandstone and the main reservoir. The reservoir came in shallow due to an incorrect seismic pick. The top reservoir reflector in the 15/12-12 well was not correctly traced over two faults.

5.0 Hydrocarbon Shows

5.0 HYDROCARBON SHOWS

5.1 Hydrocarbon Shows and Indications Whilst Drilling

Sperry-Sun used FID total gas and chromatograph instruments to monitor gas in air. Total gas concentration is reported as percent of methane in air equivalent; chromatograph gas readings are reported as parts per million of the component in air. Background values of gas below 100 PPM are considered traces.

Nordland Group 126.5m - 1259m BG 0.0 – 1.0%, MW 1.03-1.07 SG (Sea Water)

PROVENANCE	INTERVAL m	TOTAL GAS %	C ₁ ppm	C ₂ ppm	C ₃ ppm	iC ₄ ppm	nC ₄ ppm	C ₅ ppm	Fluo
Background	215-1262m	0.0 -1.0	5200	16	2	4	1	-	-
Formation gas	830m	1.3	10435	49	6	5	1	-	-
	963m	2.41	21358	42	8	2	1	-	-

Hordaland Group 1259m - 2259m

BG 0.50 – 0.60%, MW 1.55 SG

PROVENANCE	INTERVAL m	TOTAL GAS %	C ₁ ppm	C ₂ Ppm	C ₃ ppm	iC ₄ ppm	nC ₄ ppm	C ₅ ppm	Fluo
Background	1262-2255m	0.5-0.60	5047-6087	25-212	7-42	0-4	0-3	-	none

Rogaland Group 2259m - 2447m

BG 0.30 – 0.50%, MW 1.55 SG

The Rogaland Group revealed possible hydrocarbon potential in the Balder. No oil shows were noted from the cuttings.

PROVENANCE	INTERVAL m	TOTAL GAS %	C ₁ ppm	C ₂ ppm	C ₃ ppm	iC ₄ ppm	nC ₄ ppm	C ₅ ppm	Fluo
Peak (Tuff/Limestone)	2268	16.1	105359	11654	4298	392	755	-	none
Peak -Siltstone	2396	12.1	41778	6380	4441	662	1041	-	none

Shetland Group 2447 – 2692.7m

BG 0.30 – 8.00%, MW 1.57 SG

The Shetland Group proved to be without hydrocarbon potential. Accordingly there were relatively low values of background gas, with occasional low gas peaks. Low levels of heavy components were observed. Dull yellow/gold mineral fluorescence, poor slow white cuts and poor crush cuts were noted on the cuttings in top of the Tor Formation.

PROVENANCE	INTERVAL m	TOTAL GAS %	C ₁ ppm	C ₂ ppm	C ₃ ppm	iC ₄ ppm	nC ₄ ppm	C ₅ ppm	Fluo
Background	2445-2690	0.3– 8.0	2185-37210	128-4210	42-1721	5-194	11-431	-	-
Formation Gas (Tor Ls)	2459	4.9	23221	3825	2177	292	614	-	v slow wh cut
Formation Gas	2519	2.0	11495	1083	994	141	238	-	-
Formation Gas	2670	5.4	24270	2835	1431	234	477	-	-

Formation Gas	2687	4.2	22746	2458	1271	208	460	-	-
Formation Gas	2691	2.9	17529	1799	862	127	289	-	-

Cromer Knoll Group 2692.7m – 2801.6m
BG 0.20%, MW 1.57 SG

The Cromer Knoll Group proved to be without hydrocarbon potential. Accordingly there were low values of background gas and insignificant gas peaks and heavy components.

PROVENANCE	INTERVAL m	TOTAL GAS %	C ₁ ppm	C ₂ ppm	C ₃ ppm	iC ₄ ppm	nC ₄ ppm	C ₅ ppm	Fluo
Background	2690-2798	0.20	752	383	14	3	9	-	-

UPPER JURASSIC
Viking Group 2801.6m – 2911.1m
BG 0.25-0.50%, MW 1.57-1.10 SG
Heather 2834.3m – 2835.5m

PROVENANCE	INTERVAL m	TOTAL GAS %	C ₁ ppm	C ₂ ppm	C ₃ ppm	iC ₄ ppm	nC ₄ ppm	C ₅ ppm	Fluo
Background	2835	0.25	1133	131	75	4	57	-	-
Trip Gas	2835	0.60	3994	424	151	11	39	-	-

Oxfordian Sandstone 2835.5m – 2911.1m
BG 0.25-0.50%, MW 1.10 SG

PROVENANCE	INTERVAL m	TOTAL GAS %	C ₁ ppm	C ₂ ppm	C ₃ ppm	iC ₄ ppm	nC ₄ ppm	C ₅ ppm	Fluo
Background	2835-2911	0.25-0.50	1133	131	75	4	57	-	-
Sand (max)	2875	15.6	112897	8067	3815	575	1098	-	-

TRIASSIC
Hegre Group 2914.0m – 2962.5m
BG 0.1-0.3%, MW 1.10 SG

PROVENANCE	INTERVAL m	TOTAL GAS %	C ₁ ppm	C ₂ ppm	C ₃ ppm	iC ₄ ppm	nC ₄ ppm	C ₅ ppm	Fluo
Background	2911-2961	0.1-0.3	985	36	20	4	10	-	-

5.2 Shows in Cuttings:

In Tor Limestone:

Uniform dull yellow gold natural mineral fluorescence, very slow hesitant white cut, slow white crush cut, no cut colour.

In Oxfordian Sandstone:

No direct fluorescence, no crush cut fluorescence, dull yellow residue, moderately bright residual ring.

5.3 Shows in Cores/Sidewall Cores:

There were no cores taken.

6.0 Data Acquisition

6.0 GEOLOGICAL WELL DATA ACQUISITION

Atle Scholze, Gareth Bowes, Jay Patel and Dave Tinsley provided wellsite geological supervision. Wellsite geological services began with one geologist, working days, from spud. At the end of the 36" section, from 191.5m, two Wellsite Geologists were covering the operation. The mud-logging contractor, Sperry/Halliburton, provided a two-man crew of data engineers. From the top of the 17 1/2" section, two sample catchers were on site.

The following log is enclosed with the report:

Log	Scale	Depths	Compiled by
Composite 15/12-16 S	1:500	126.5m – 2961m	WSG

HRH Limited "Winlog" TVD Edition v.3 software was used to generate the Composite Log.

6.1 Cuttings Sampling

Sampling programme

Type	Set	Box#	Depth	Sent To
Unwashed/Wet	A&B	1-25	220m – 2961m	Talisman (RESLAB)
Washed/"Dried"	S	27	220m – 2961m	Talisman (RESLAB)
Mud Sample	M	26	1361m – 2961m	Talisman (RESLAB)

Number of Boxes sent to town= 52

Sample Intervals

Samples were caught at the following intervals:

Mudloggers caught samples in the 17 1/2", 12 1/4" and 8 1/2" section.

Mud samples were taken every 500m above the reservoir and every 20m in the reservoir.

Interval	Depth	Frequency
Nordland –Sola	191m – 2750m	10m
Sola- TD	2753m – 2961m	3m (as possible)

Sample Quality

Drill cuttings sample was poor to fair in the 17 1/2" section, mainly due to the fact that sticky clays were drilled, much of which was dissolved into seawater before reaching the surface. As a result, samples were commonly very soft, amorphous and sticky with low amounts of cuttings reaching the shaker screens. Hi Vis pills were commonly pumped to maintain low ECD and LCM was occasionally seen in the samples.

Depth	Hole Size	Sample Frequency	Quality	Remarks
215m – 1319m	17 1/2"	10m	Fair to poor	
1319m – 2835m	12 1/4"	10m & 3m	Fair to poor	
2835m – 2961m	8 1/2"	3m	Fair to poor	

6.2 FEMWD Surveys

Halliburton/Sperry-Sun provided the MWD/LWD services in the 17 ½”, 12 ¼” and 8 ½” hole sections.

LOG RUNS 15/12-16 S						
RUN NO.	DATE	TOOL STRING	LOGGED INTERVAL	HOLE SIZE	MAX TEMP	REMARKS
M1.1	12.02.06 - 13.02.06	EWR-GR-PWD-DM-GYRO	187-207m	17 ½”	Max circ. 14°C	Total losses at conductor shoe. POOH and cement.
M1.2	13.02.06 - 14.02.06	EWR-GR-PWD-DM-GYRO	207m - 207m	17 ½”	na	No new formation drilled as conductor still leaking. POOH and cement shoe again.
M1.3	15.02.06 - 18.02.06	GR-RES-DIR-PWD-GYRO	207-1319m	17 ½”	Max circ. 24°C	SperryDrill bent-sub motor run with Scientific MWD and Gyro. Intermittent intervals of poor real time gamma ray due to high ROP and KCL sweeps. Intermittent gaps in real time data. Detection problems due to high ROP and KCL sweeps.
M2.1	25.02.06 - 26.02.06	GR-RES-DIR-PWD-	1319-1365m	12 ¼”	Static RIH to 1319m 33°C	GeoPilot run. Geopilot failed with no communication possible.
M2.2	26.02.06 - 01.03.06	GR-RES-DIR-PWD-ABG	1365 -2355m	12 ¼”	Static RIH to 1365m 42 °C	POOH due to slow penetration rates. Good MWD run.
M2.3	01.03.06 - 03.02.06	GR-RES-DIR-PWD-ABG	2355-2474m	12 ¼”	“?Static” RIH to 2355m 52°C	POOH due to Geopilot failure. Good MWD run.
M2.4	04.03.06 - 07.03.06	GR-RES-DIR-PWD-ABG	2474 -2835m	12 ¼”	Max circ. 83°C Static RIH to 2474m 80 °C	When back on bottom after a trip to shoe, the near bit gamma was intermittent due to noise. Also main Gamma was intermittently not sampled in the real-time data base, after some 15-20m suddenly the database was updated and the trace plotted on the monitor.
M3.1	11.03.06 - 12.03.06	GR-RES-DIR-PWD	2835-2961m	8 ½”	Static RIH to 2835m 87°C	Good run

6.3 Wireline Logging

Schlumberger were contracted for the wireline service. On the first run, (AIT-DSI-GR), the shallow resistivity (10 inch) gave poor, inaccurate readings on the main open hole uplog. Other resistivity traces were relatively accurate outside the reservoir, however most resistivities gave erratic, inaccurate readings over the reservoir interval. This was as expected due to the high KCL content in the mud, which was out of specification for the AIT tool. It was decided to run the AIT tool anyway. An open hole uplog with high sampling rate was performed from TD to the 9 5/8" casing shoe, acquiring compressional (DTC) shear (DTS) and Stoneley waves. This was followed by a DSI logging pass inside the casing to acquire DTS and DTC waves for locating the top of the cement. Logging was stopped when casing ringing was observed. Gamma ray was then recorded to surface, only slowing down to obtain better readings across the Utsira sands. After-log verifications were then carried out on the gamma ray, before laying down tools.

The second run (LDL/APS) was a good run with no obvious problems, apart from the caliper giving low readings of approximately 7.7 inches. Depth was correlated to run #1 by adding 0.5m to the log depth on run #2. After performing a downlog from the casing shoe to TD, Neutron and Density data was recorded at high sampling rate from TD to the casing shoe. A 60m repeat section was then performed below the casing shoe. This showed good trend repeatability but was approximately 0.3 to 0.4m out on depth. A caliper check inside the casing then confirmed that the caliper was giving a low reading of 7.7 inches. Neutron data was then acquired for one complete interval from the casing shoe to above the Tor Formation Chalk, after which the string was pulled to surface and an after-log verification performed.

Run 3: MDT – A total of 24 tests were performed with 16 good tests. Very good tests in the main RZ1 reservoir. Only moderate and tight tests with lost seals or no seals in the lower part of the reservoir below 2886m MD.

Run 4: VSP – Ran in hole, taking check shots at 1000m and 2025m. Recorded 60 stations from deepest depth of 2950m to 2050m at 15m intervals, with check shots every 500m to surface.

WIRELINE LOG RUNS 15/12-16 S						
RUN NO.	DATE	TOOL STRING	LOGGED INTERVAL	HOLE SIZE	MAX TEMP	REMARKS
W1.1	12-13.03.2006	AIT-DSI-GR	AIT 2827-2960.1 DSI 2962.5- 2200 GR 2962.5- surface	CSG & 8 1/2"	122 °C	LAS files sent into town showed AIT to be 3m off depth.

W1.2	13.03.2006	LDL-APS	2961–2414	8 ½” & CSG	122°C	
W1.3	13.03.2006	MDT	2840.3 -2949.5	8 ½”	123°C	
W1.4	14.03.2006	VSP (CSI)	2950-2025 Checkshots up to 500m	8 ½” & CSG	-	

WIRELINE LOST TIME ANALYSIS 15/12-16 S				
RUN NO.	DATE	TOOL STRING	LOST TIME (Hrs)	REMARKS
W1.1	12-13.03.2006	AIT-DSI-GR	None	
W1.2	13.03.2006	LDL-APS	None	
W1.3	13.03.2006	MDT	None	
W1.4	14.03.2006	VSP (CSI)	None	

7.0 CPI Analysis, Log Editing and Environmental Corrections

7.1 Log Quality

LWD

- 17.5" hole BHA #2: Dir/GR/Res (Halliburton). In at 207m. Out at 1309 (section TD). **Real time** GR erratic and lacking character. Attributed to KCl sweeps. **Memory** LWD gamma and resistivity log quality was considered to be generally good.
- 12.25" hole BHA #8: Geopilot/SGR/EWR/PWD/DIR. In at 1319m. Out at 1365m (geopilot failure) lwd data good.
- 12.25" hole BHA #9: Geopilot/SGR/EWR/PWD/DIR. In at 1365m. Out at 2355m (no rop-bit change) lwd data good
- 12.25" hole BHA #10: Geopilot/SGR/EWR/PWD/DIR. In at 2355m. Out at 2474m (geopilot failure) rt lwd data good, problems downloading memory.
- 12.25" hole BHA #11: Geopilot/SGR/EWR/PWD/DIR. In at 2474m. Out at 2835m, section TD.

Throughout the Tertiary the resistivity logs overlaid each other through the claystones, as expected, with the exception of the extra shallow phase measurement which is more affected by the wellbore conditions. An invasion profile was seen in the Ekofisk and Tor Chalks indicating permeability.

LWD gamma and resistivity log quality (memory) was considered to be generally good throughout the well.

Wireline Logging Runs

1 suite of logs were run at TD in the 8.5" open hole section. The DSI and APLC logs were both recoded through the 9 5/8" casing, with the GR being logged to surface. After running 7" liner a GR/CCL was run

Run 1.1: AIT/DSI/GR (Sonic / Resistivity)

Run 1.2: LDL/APS/GR (Density/Neutron)

Run 1.3: MDT/GR (Took 24 pretests, 16 good)

Run 1.4: CST/GR (VSP seismic)

Run 2.1: GR/CCL (cased hole log for perforating guns)

Hole quality was inferred by the caliper to be good in the 8 1/2" section and wireline data quality was considered generally good. The AIT tool was available on the rig and was run in an environment which really required a laterolog for the high resistivity gas bearing zones. The tool gave good agreement with the MWD resistivity tool in the lower resistivity zones but was struggling at the upper end. The values from the MWD were good and reliable and as such the AIT was not required.

A poor cement job on the 9 5/8" casing resulted in the patchy cement casing contact in the upper part of the chalk group. Consequently, the DTC values in the upper part of the Shetland Group were unreliable.

7.2 Borehole/Environmental Corrections.

7.2.1 MUD Properties

Interval	Hole Size	Mud	Weight	Viscosity	Salinity	WL
M	Ins		SG	cp	Mg/l	Cc/30min
0 - 191.5	36	SW				
191.5 - 1100	17.5	SW	1.09			
1100 - 1319	17.5	WBM	1.2	-	62,000	7
1319 - 2835	12.25	WBM	1.59	78	80,000	3
2835 - 2927	8.5	WBM	1.1	78	74,000	3

Density, Neutron and Gamma Ray data were subject to environmental corrections by the contractor before being delivered to Talisman. The following corrections were made by the contractors:

Sperry Sun LWD

1. Smoothing parameters have been applied to the gamma and resistivity curves data: 0.1524 m interval and 0.183 m coercion distance.

3. The Halliburton gamma ray below 1341m to TD has been corrected for borehole size and mud weight.

Schlumberger Wireline

1. The wireline LDL/APS was recorded in standard-resolution mode. The neutron porosity APLC was corrected for pressure, temperature, mud weight, mud cake, hole size and standoff. Density was corrected for hole size.

2. ABC (Analysis Behind Casing) processing was used to produce more reliable DTCO and DTSM curves from the DSI

7.3 Depth Shifts and Log Editing

Composite LWD was provided by Halliburton.

Wireline data was supplied by Schlumberger as three LAS files:

Schlumberger Las File	Interval	Hole Condition	Start (m, MD)	Stop (m, MD)
AIT_DSI_033PUP.DLIS	Jurassic/Triassic	Open Hole RPT	2881	2956
AIT_DSI_034PUP.DLIS	Jurassic/Triassic	Open Hole	2763	2968
AIT_DSI_036PUP.DLIS	Shetland/Cromer Knoll	Through casing	2190	2862

LDL_APS_047PUP	Jurassic/Triassic	Open Hole	2731	2968
LDL_APS_052PUP	Shetland/Cromer Knoll	Through casing	2413	2809
LDL_APS_055PUP	Jurassic/Triassic	Open Hole RPT	2814	2905

Wireline data was taken as definitive depth and LWD data was shifted to match wireline (gamma) as follows:

DEPTH	DEPTH_COR	Shift
166.57	162.83	-3.74
207.65	203.91	-3.74
230.95	227.53	-3.42
271.02	268.07	-2.95
867.95	864.87	-3.08
929.84	926.90	-2.94
1092.49	1089.36	-3.13
1157.90	1154.58	-3.32
1259.69	1256.08	-3.61
1415.52	1412.14	-3.38
1459.76	1455.27	-4.49
1466.26	1463.34	-2.92
1673.06	1670.30	-2.75
1711.37	1709.01	-2.36
1755.99	1754.28	-1.72
1791.05	1789.48	-1.57
1838.45	1836.72	-1.73
1866.75	1864.46	-2.29
1979.75	1978.61	-1.14
2008.88	2008.33	-0.55
2167.65	2170.94	3.29
2243.98	2247.29	3.31
2249.14	2252.01	2.88
2266.67	2270.76	4.09
2321.51	2325.32	3.81
2339.04	2342.08	3.05
2408.53	2411.27	2.74
2763.62	2766.36	2.74
2798.37	2801.26	2.90
2831.29	2834.03	2.74
2853.65	2856.74	3.09
2858.42	2861.92	3.50
2891.84	2893.77	1.93
2897.65	2900.02	2.37
2916.16	2918.00	1.84
2925.32	2927.60	2.29
2939.49	2941.47	1.98
2944.06	2945.89	1.83
2957.93	2959.76	1.83

Composite GR

The Correlation Gr (GRXX) was generated from 3 wireline files,
Surface to 2214 (GR through casing for GR only from AIT_DSI)
2214 to 2836 (AIT_DSI casing run inside casing for DSI data)
2836 to TD (from LDL/APS run)

The MWD KBGR gives significantly more character and has been used from surface to TD as the final GR (HGR). This log was depth matched to the GRXX. The logs were manually edited to remove the effect of the casing shoes and ratholes around 1313 and 2826m.

Composite Resistivity

LWD phase measurements were used throughout the well. The depth shifts above have been applied to these logs. All the logs have been topped and tailed and the effects of casing have been manually removed.

	Deep	Medium	Shallow	Ext. Shall.		Depths
LWD Curve	SEDP	SEMP	SESP	SEXP		176-2956 m

Composite Density, Neutron, PE

Density (RHOM), Density Correction (DRHO), and the PEFL were only acquired in open hole (2827-2968m). The density log has been topped and tailed to remove spurious data.

The neutron composite curves are a splice of the APLC curves acquired in open hole and the cased hole run.

Composite DSI LOGS

The sonic composite curves, DTCO, DTSM, VPVS and PR are a splice of the curves acquired in open hole and the cased hole run. The cased hole DTCO has gaps due to poor data as direct result of the poor cement job

Final Composite Data Set

To summarise composite data set:

Composite	Data Source
APLC	Composite of open and cased hole APLC files
DRHO	8.5" open hole only
DTCO	Composite of open hole DTCO and processed cased hole DTCO logs
DTSM	Composite of open hole DTSM and processed cased hole DTSM logs

GASA	Average Total Gas from Mudlogging data depth shifted as above
GASX	Maximum Total Gas from Mudlogging data depth shifted as above
HGR	Depth shifted MWD KBGR
LCAL	8.5" open hole calliper from LDL
PEFL	8.5" open hole PE log
PR	Spliced open hole PR and processed cased hole PR Ratios
RHOM	8.5" open hole density log
SEDA	Depth shifted MWD Deep Attenuation
SEDP	Depth shifted MWD Deep Phase
SEMA	Depth shifted MWD Medium Attenuation
SEMP	Depth shifted MWD Medium Phase
SESA	Depth Shifted MWD Shallow Amplitude
SESP	Depth shifted MWD Shallow Phase
SEXA	Depth shifted MWD Extra Shallow Amplitude
SEXP	Depth shifted MWD Extra Shallow Phase
SROP	Depth shifted MWD ROP
VPVS	Spliced open hole VPVS and processed cased hole VPVS ratios

7.4 Petrophysical Zonation

7.4.1 Formation Tops

Group & Formation	Prognosed Depth (m)		Uncertainty (+/-)m	Actual Depth (m)		Deep (+) Shallow (-)
	MD	TVDSS		MD	TVDSS	
Nordland Gp	126	87		126.5	87.0	0
Utsira Fm	1180.5	1135		1192.7	1146.5	11.5
Hordaland Gp	1256.6	1210		1259.0	1211.6	1.6
Rogaland Gp (Balder Fm)	2259.4	2199	10	2259.0	2197.7	-1.3
Sele Fm	2272.5	2212		2267.5	2206.1	-5.9
Lista Fm	2327.3	2266		2325.3	2263.0	-3.0
Maureen Fm	2426.6	2364		2435.8	2372.2	8.2
Shetland Gp (Ekofisk Fm)	2450.0	2387	15	2447.0	2383.3	-3.7
Tor Fm	2455.1	2392		2455.7	2391.9	-0.1
Hod Fm	2562.0	2496		2581.7	2514.8	18.8
Blodøks Fm	2655.7	2585		2674.6	2602.3	17.3
Hidra Fm	2680.4	2608		2683.4	2610.4	2.4
Cromer Knoll Gp (Rodby Fm)	2682.5	2610	20	2692.7	2618.9	8.9
Sola Fm	2731.3	2655		2714.5	2638.2	8.2
Åsgard	2766.6	2687		2781.6	2699.2	12.2
BCU (Draupne Fm)	2783.3	2702		2801.6	2716.9	14.9
Heather Fm	2870.5	2780		2834.3	2745.9	-34.1
Top Reservoir (RZ1)	2908.5	2814	25	2835.5	2747.0	-67.0
Top RZ2	2968.8	2868		2875.4	2782.2	-85.8
Top RZ3	3011.2	2906		2880.8	2787.1	-118.9
Top Triassic	Not prognosed			2911.1	2813.7	
TD	3042.5	2934	25	2962.5	2858.8	-75.2

7.4.2 Oxfordian Reservoir Zonation and Parameters

Zone	a, m, n	RHO MA	RHOMF	RHOSH	RHOSH DRY	DTMA	DTF	DTSH	RTSH	GRMAX	GRMIN	RW	Temp F
RZ1.1	1, 1.97, 1.77	2.65	0.7	2.55	2.69	55	210	70	0.7	120	30	0.0153	260
RZ1.2	1, 1.97, 1.77	2.65	0.7	2.55	2.69	55	210	70	0.7	120	30	0.0153	260
RZ1.3	1, 1.97, 1.77	2.65	0.7	2.55	2.69	55	210	70	0.7	120	30	0.0153	260
RZ2.1	1, 1.97, 1.77	2.65	0.7	2.55	2.69	51	210	70	0.7	120	30	0.0153	260
RZ2.2	1, 1.97, 1.77	2.65	0.7	2.55	2.69	51	210	70	0.7	120	30	0.0153	260
RZ3.1	1, 1.97, 1.77	2.65	0.7	2.55	2.69	55	210	70	0.7	120	30	0.0153	260
RZ3.2	1, 1.97, 1.77	2.65	0.7	2.55	2.69	55	210	70	0.7	120	30	0.0153	260
RZ3.3	1, 1.97, 1.77	2.65	0.7	2.55	2.69	54	210	70	0.7	120	30	0.0153	260

The matrix densities of the zones were derived from nearby well 15/12-12 which was extensively cored. Gas effect on the logs makes the log derived matrix values unreliable.

Formation water resistivity is based on a sample from a DST in well 15/12-9S.

7.4.3 Chalk Group Reservoir Zonation and Parameters

Zone	A, m, n	RHOSH DRY	DTMA	DTF	DTSH	RTSH	GRMAX	GRMIN	RW	Temp F
Ekofisk	1, 2, 2	2.69	49	189	85		20	80	0.035	123
Tor	1, 2, 2	2.69	49	189	85		20	80	0.035	123
Hod	1, 2, 2	2.69	49	189	85		20	80	0.035	123

All log porosity logs were acquired through the casing.

DTC log data was not available throughout the chalk due to patchy cement behind the casing

The APLC neutron log was used for porosity determination, without correction for shale

Cores of the chalk are not available, therefore matrix and fluid parameters used are “standard” for this rock type.

Formation water resistivity is based on Rwa in the water zone.

A standard Archie SW was used.

7.5 Analysis Methodology – Oxfordian Sandstone

Vshale

Volume of shale was calculated using the linear GR method:

$$VSH = \frac{GR - GR_{sand}}{GR_{shale} - GR_{sand}}$$

Where

VSH =	Volume of clay
GR =	Gamma Ray log response
GR _{sand} =	Gamma ray log response in clean sand
GR _{shale} =	Gamma ray log response in a shale

The GR_{sand} and GR_{shale} points selected for this well were 30 and 120 api respectively.

Porosity

Total porosity is calculated using

$$PHIT = \frac{(\rho_{ma} - \rho)}{(\rho_{ma} - \rho_{fl})}$$

and effective porosity was calculated using:

$$PHIE = \frac{(\rho_{ma} - \rho)}{(\rho_{ma} - \rho_{fl})} - VSH \cdot \left(\frac{\rho_{ma} - \rho_{sh}}{\rho_{ma} - \rho_{fl}} \right) \quad 3.1$$

Where:

PHIT =	Total porosity
PHIE =	Effective porosity (V/V)
ρ_{ma} =	Matrix density in clean (non shaly) reservoir rocks (g/cc)
ρ_{sh} =	Shale density (g/cc)
ρ_{fl} =	Fluid density in the flushed zone (g/cc)
ρ =	Density derived from the density log (g/cc)

The density tool is a shallow reading tool and consequently ρ_{fl} is the fluid density seen by the density tool in the flushed, which is combination of mud filtrate, connate water and formation hydrocarbons. Based on general field experience in the cored wells, an apparent fluid density of 0.7 was assumed. Grain density was set to 2.65 g/cc.

Water Saturation

Water saturation was calculated from the Archie equation: (Note: as a quality check analysis was also undertaken using the shaly sand Indonesia method.

$$S_w^n = \frac{aR_w}{\phi^m R_t}$$

Where

S_w	=	Water saturation (v/v)
$a, m, n,$	=	Saturation parameters
R_w	=	Water resistivity (ohm)
R_t	=	True formation resistivity

The saturation parameters were taken from established Varg petrophysical model where $a = 1.00$, $m = 1.97$ and $n = 1.77$. A formation water resistivity (R_w) of 0.0153 Ohmm at 127 deg C has been used (equivalent NaCl salinity 170 kppm). This value is based on a water sample taken from DST1 in well 15/12-9s and confirmed by log analysis and the calculation of R_{wa} .

The water resistivity was corrected to formation temperature using the ARPS equation:

$$R_{w_1} = R_{w_2} \left[\frac{T_1 + 6.77}{T_2 + 6.77} \right]^{0.01} F$$

Where:

R_{w_1}	=	R_w at required temperature
R_{w_2}	=	R_w at reference temperature
T_1	=	Required Temperature, °F
T_2	=	Reference Temperature, °F

Formation temperature was calculated using a reference of 127 deg C (260 F) at 2838 m with a gradient of 1.9deg C / 100 m.

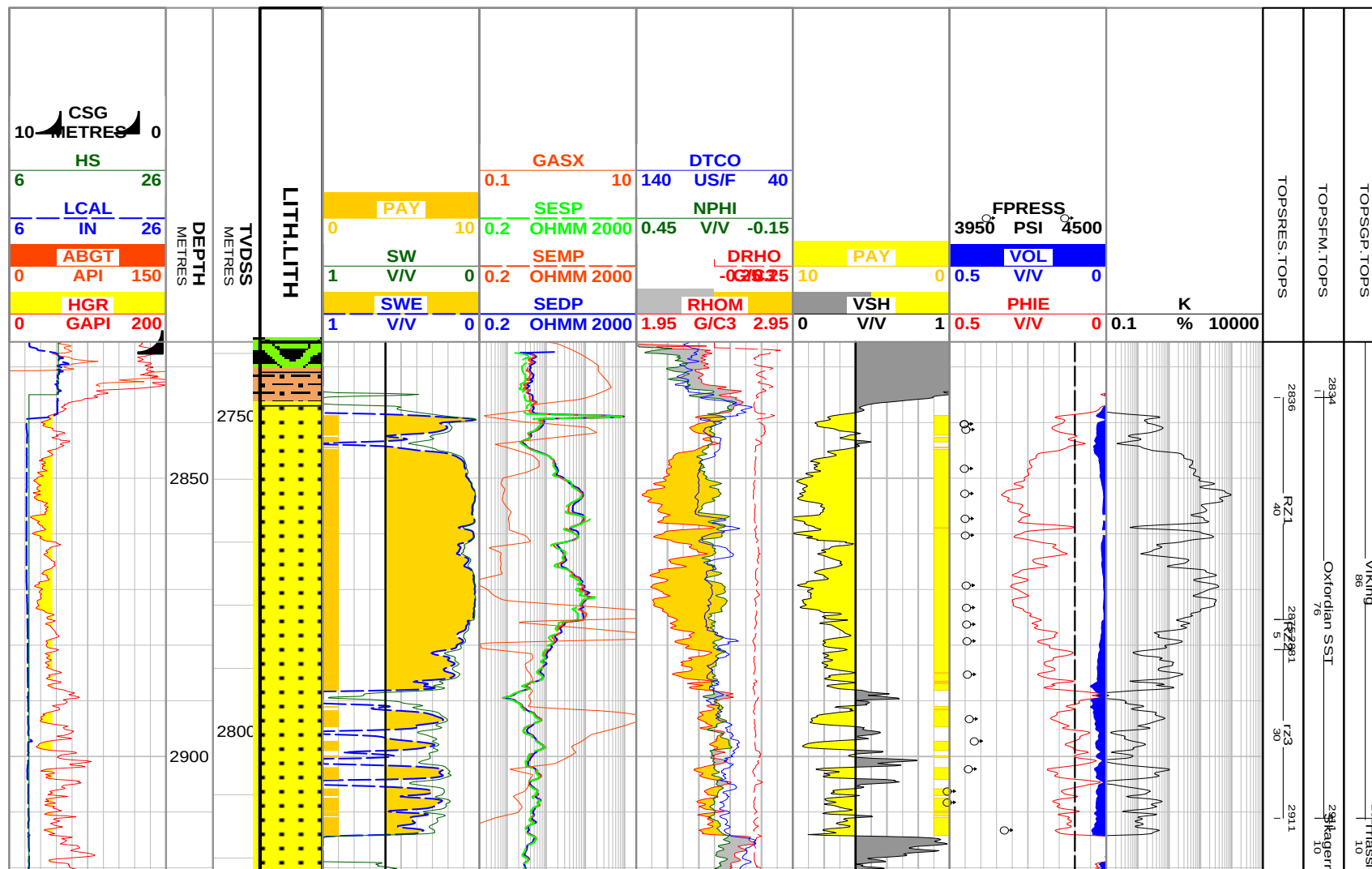
Permeability

$$K = 10^{**}(13.46832 * PHIE - 1.54020)$$

The permeability transform used was derived from a regression of the core data from well 15/12-12

Soneley permeability analysis was done by a third party (Logtek)

CPI – Oxfordian Sandstone



Pay summary – Reservoir (Archie)

PHIE >= .1 V/V
VSH <= 0.4 V/V

	DEPTH METRES	GROSS METRES	NET METRES	NET_TO_GROSS M/M	PHIEH (V/V)M	BVWH (V/V)M	HVOLH (V/V)M	PHIE_AV V/V	SWE_AV V/V	K_AM MD
[Interval: RZ1; Well: 15_12-16S]										
2835.50 to 2875.40	2875.40	39.90	34.59	0.87	8.22	1.71	6.50	0.24	0.21	126.72
[Interval: RZ2; Well: 15_12-16S]										
2875.40 to 2880.80	2880.80	5.40	5.40	1.00	1.06	0.21	0.85	0.20	0.20	16.93
[Interval: RZ3; Well: 15_12-16S]										
2880.80 to 2911.10	2911.10	30.30	19.17	0.63	2.91	0.86	2.05	0.15	0.29	4.89
[Well 15_12-16S]										
2835.50 to 2911.10	2911.10	75.60	59.16	0.78	12.18	2.78	9.40	0.21	0.23	77.21
[Interval summaries for well 15_12-16S]										
[Interval: RZ1; Well: 15_12-16S]										
2835.50 to 2875.40	2875.40	39.90	34.59	0.87	8.22	1.71	6.50	0.24	0.21	126.72
[Interval: RZ2; Well: 15_12-16S]										
2875.40 to 2880.80	2880.80	5.40	5.40	1.00	1.06	0.21	0.85	0.20	0.20	16.93
[Interval: RZ3; Well: 15_12-16S]										
2880.80 to 2911.10	2911.10	30.30	19.17	0.63	2.91	0.86	2.05	0.15	0.29	4.89

Pay summary – Pay (Archie)

PHIE >= .1 V/V
SWE <= .6 V/V
VSH <= 0.4 V/V

	DEPTH METRES	GROSS METRES	NET METRES	NET_TO_GROSS M/M	PHIEH (V/V)M	BVWH (V/V)M	HVOLH (V/V)M	PHIE_AV V/V	SWE_AV V/V	K_AM MD
[Interval: RZ1; Well: 15_12-16S]										
2835.50 to	2875.40	39.90	34.59	0.87	8.22	1.71	6.50	0.24	0.21	126.72
[Interval: RZ2; Well: 15_12-16S]										
2875.40 to	2880.80	5.40	5.40	1.00	1.06	0.21	0.85	0.20	0.20	16.93
[Interval: RZ3; Well: 15_12-16S]										
2880.80 to	2911.10	30.30	18.57	0.61	2.84	0.81	2.03	0.15	0.29	5.02
[Well 15_12-16S]										
2835.50 to	2911.10	75.60	58.55	0.77	12.11	2.74	9.38	0.21	0.23	78.01
[Interval summaries for well 15_12-16S]										
[Interval: RZ1; Well: 15_12-16S]										
2835.50 to	2875.40	39.90	34.59	0.87	8.22	1.71	6.50	0.24	0.21	126.72
[Interval: RZ2; Well: 15_12-16S]										
2875.40 to	2880.80	5.40	5.40	1.00	1.06	0.21	0.85	0.20	0.20	16.93
[Interval: RZ3; Well: 15_12-16S]										
2880.80 to	2911.10	30.30	18.57	0.61	2.84	0.81	2.03	0.15	0.29	5.02

Pay summary – Reservoir (Indonesia)

PHIE	>= .1 V/V									
VSH	<= 0.4 V/V									
	DEPTH METRES	GROSS METRES	NET METRES	NET_TO_GROSS M/M	PHIEH (V/V)M	BVWH (V/V)M	HVOLH (V/V)M	PHIE_AV V/V	SWE_IND0_AV V/V	K_AM MD
[Interval: RZ1; Well: 15_12-16S]										
2835.50 to 2875.40	2875.40	39.90	34.59	0.87	8.22	0.49	7.28	0.24	0.06	126.72
[Interval: RZ2; Well: 15_12-16S]										
2875.40 to 2880.80	2880.80	5.40	5.40	1.00	1.06	0.09	0.97	0.20	0.09	16.93
[Interval: RZ3; Well: 15_12-16S]										
2880.80 to 2911.10	2911.10	30.30	19.17	0.63	2.91	0.63	2.28	0.15	0.22	4.89
[Well 15_12-16S]										
2835.50 to 2911.10	2911.10	75.60	59.16	0.78	12.18	1.21	10.53	0.21	0.10	77.21
[Interval summaries for well 15_12-16S]										
[Interval: RZ1; Well: 15_12-16S]										
2835.50 to 2875.40	2875.40	39.90	34.59	0.87	8.22	0.49	7.28	0.24	0.06	126.72
[Interval: RZ2; Well: 15_12-16S]										
2875.40 to 2880.80	2880.80	5.40	5.40	1.00	1.06	0.09	0.97	0.20	0.09	16.93
[Interval: RZ3; Well: 15_12-16S]										
2880.80 to 2911.10	2911.10	30.30	19.17	0.63	2.91	0.63	2.28	0.15	0.22	4.89

Pay summary – Pay (Indonesia)

PHIE >= .1 V/V
SWE_INDO <= .6 V/V
VSH <= 0.4 V/V

	DEPTH METRES	GROSS METRES	NET METRES	NET_TO_GROSS M/M	PHIEH (V/V)M	BVWH (V/V)M	HVOLH (V/V)M	PHIE_AV V/V	SWE_INDO_AV V/V	K_AM MD
[Interval: RZ1; Well: 15_12-16S]										
2835.50 to 2875.40	2875.40	39.90	32.91	0.82	7.77	0.49	7.28	0.24	0.06	127.69
[Interval: RZ2; Well: 15_12-16S]										
2875.40 to 2880.80	2880.80	5.40	5.40	1.00	1.06	0.09	0.97	0.20	0.09	16.93
[Interval: RZ3; Well: 15_12-16S]										
2880.80 to 2911.10	2911.10	30.30	19.17	0.63	2.91	0.63	2.28	0.15	0.22	4.89
[Well 15_12-16S]										
2835.50 to 2911.10	2911.10	75.60	57.49	0.76	11.74	1.21	10.53	0.20	0.10	76.33
[Interval summaries for well 15_12-16S]										
[Interval: RZ1; Well: 15_12-16S]										
2835.50 to 2875.40	2875.40	39.90	32.91	0.82	7.77	0.49	7.28	0.24	0.06	127.69
[Interval: RZ2; Well: 15_12-16S]										
2875.40 to 2880.80	2880.80	5.40	5.40	1.00	1.06	0.09	0.97	0.20	0.09	16.93
[Interval: RZ3; Well: 15_12-16S]										
2880.80 to 2911.10	2911.10	30.30	19.17	0.63	2.91	0.63	2.28	0.15	0.22	4.89

7.6. Analysis Methodology – Chalk Group

The GR and resistivity log indicated a possible hydrocarbon interval at the top of the chalk interval, consequently sonic and neutron were run in cased hole over this section. Unfortunately the cement job behind the casing was not good over the pay section and consequently only the neutron log was useable. The chalk interval was subject to a quick look analysis using generalized parameters and water resistivity derived from log analysis.

Vshale

Volume of shale was calculated using the linear GR method:

$$VSH = \frac{GR - GR_{sand}}{GR_{shale} - GR_{sand}}$$

Where

V	=	Volume of clay
GR	=	Gamma Ray log response
GR _{sand}	=	Gamma ray log response in clean sand
GR _{shale}	=	Gamma ray log response in a shale

The GR_{sand} and GR_{shale} points selected for this well were 20 and 80 api respectively.

Porosity

Total porosity is calculated using

$$PHIT = APLC$$

Where:

PHIT	=	Total porosity
APLC	=	Neutron Porosity

The logs were not shale corrected, consequently PHIT = PHIE in the TOR but PHIT > PHIE in the Hod.

Water Saturation

Water saturation was calculated from the Archie equation:

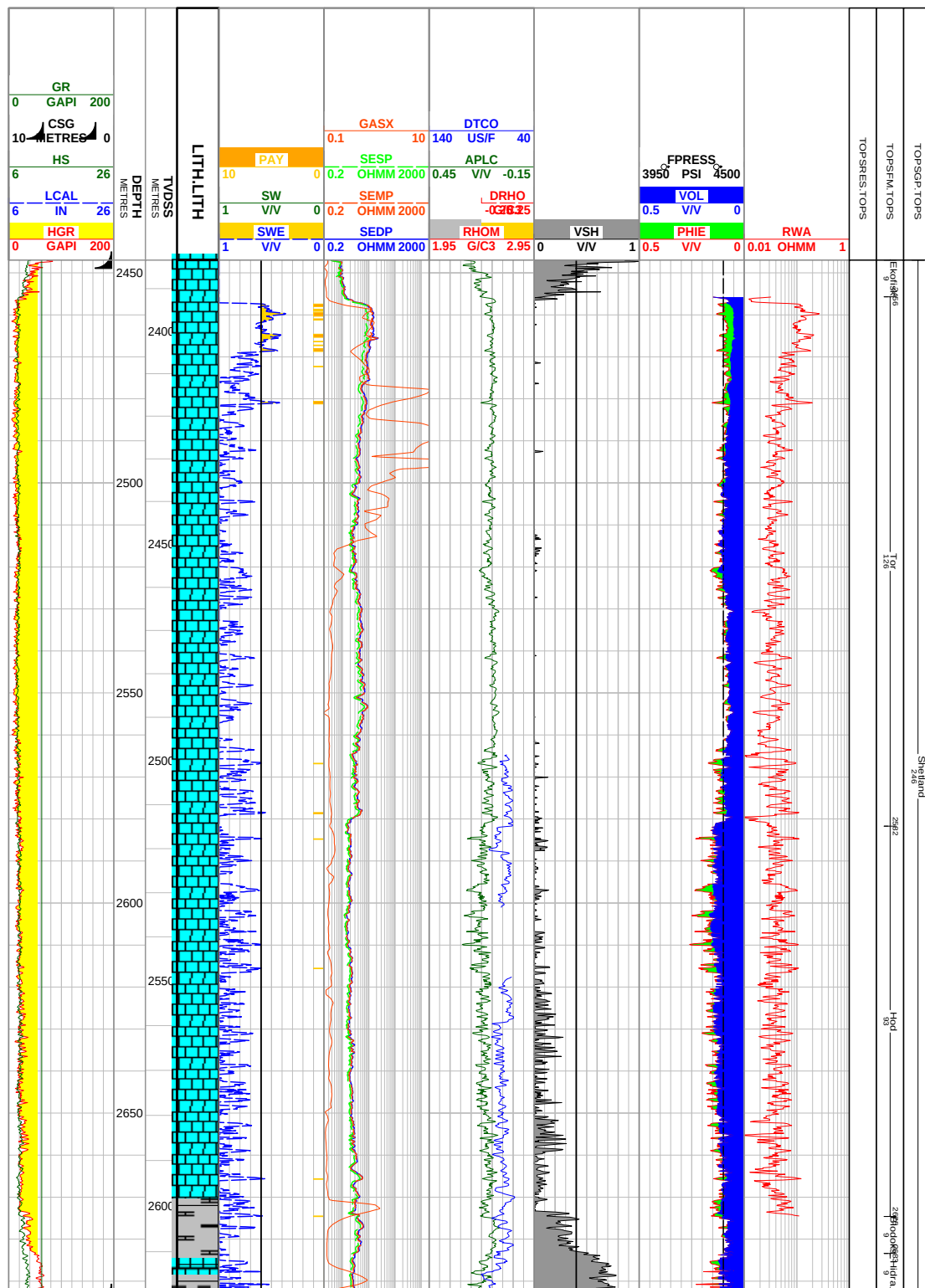
$$S_w^n = \frac{aR_w}{\phi^m R_t}$$

Where

S _w	=	Water saturation (v/v)
a, m, n,	=	Saturation parameters
R _w	=	Water resistivity (ohm)
R _t	=	True formation resistivity

In the absence of core data *a*, *m* and *n* were set to 1.0, 2.0 and 2.0 respectively. The values reflect general experience of petrophysical evaluation of the chalk in the North

Sea. Rw was calculated from Rwa analysis over the water bearing interval in the chalk. Rw was calculated as 0.035 Ohmm at 123 deg C, equivalent to 68 kppm NaCl. A OWC of 2502 m is suggested from the logs.



Pay Summary Specification: general

Primary reference for reporting and sample control: DEPTH

Cutoff details:-

PHIE >= .1 V/V

SWE <= .6 V/V

VSH <= 0.4 V/V

Lumping details:-

Standalone Minimum Thickness: 0 METRES

Include Minimum Thickness: 0 METRES

Maximum Separation: 0 METRES

Well	Interval	DEPTH_TOP METRES	DEPTH_BASE METRES	GROSS METRES	NET METRES	NET_TO_GROSS M/M	PHIEH (V/V)M	BVWH (V/V)M	HVOLH (V/V)M	PHIE_AV V/V	SWE_AV V/V	K_AM MD
15_12-16S	EKOFISK	2447.00	2455.70	8.70	0.00	0.00	0.00	0.00	0.00	-	-	-
15_12-16S	TOR	2455.70	2581.70	126.00	5.03	0.04	0.60	0.30	0.30	0.12	0.49	-
15_12-16S	HOD	2581.70	2674.60	92.90	0.61	0.01	0.11	0.07	0.05	0.19	0.59	-
15_12-16S	BLODOKS	2674.60	2683.40	8.80	0.00	0.00	0.00	0.00	0.00	-	-	-
15_12-16S	HIDRA	2683.40	2692.70	9.30	0.00	0.00	0.00	0.00	0.00	-	-	-
15_12-16S		2447.00	2692.70	245.70	5.64	0.02	0.72	0.36	0.35			

Pay Summary Specification: general

Primary reference for reporting and sample control: DEPTH

Cutoff details:-

PHIE $\geq .1$ V/V

VSH ≤ 0.4 V/V

Lumping details:-

Standalone Minimum Thickness: 0 METRES

Include Minimum Thickness: 0 METRES

Maximum Separation: 0 METRES

Well	Interval	DEPTH_TOP METRES	DEPTH_BASE METRES	GROSS METRES	NET METRES	NET_TO_GROSS M/M	PHIEH (V/V)M	BVWH (V/V)M	HVOLH (V/V)M	PHIE_AV V/V	SWE_AV V/V	K_AM MD
15_12-16S	EKOFISK	2447.00	2455.70	8.70	0.00	0.00	0.00	0.00	0.00	0.15	1.00	-
15_12-16S	TOR	2455.70	2581.70	126.00	43.25	0.34	5.12	4.08	1.03	0.12	0.80	-
15_12-16S	HOD	2581.70	2674.60	92.90	84.98	0.91	12.18	10.90	1.28	0.14	0.90	-
15_12-16S	BLODOKS	2674.60	2683.40	8.80	1.92	0.22	0.21	0.18	0.03	0.11	0.84	-
15_12-16S	HIDRA	2683.40	2692.70	9.30	0.00	0.00	0.00	0.00	0.00	-	-	-
15_12-16S	-	2447.00	2692.70	245.70	130.15	0.53	17.51	15.16	2.35			

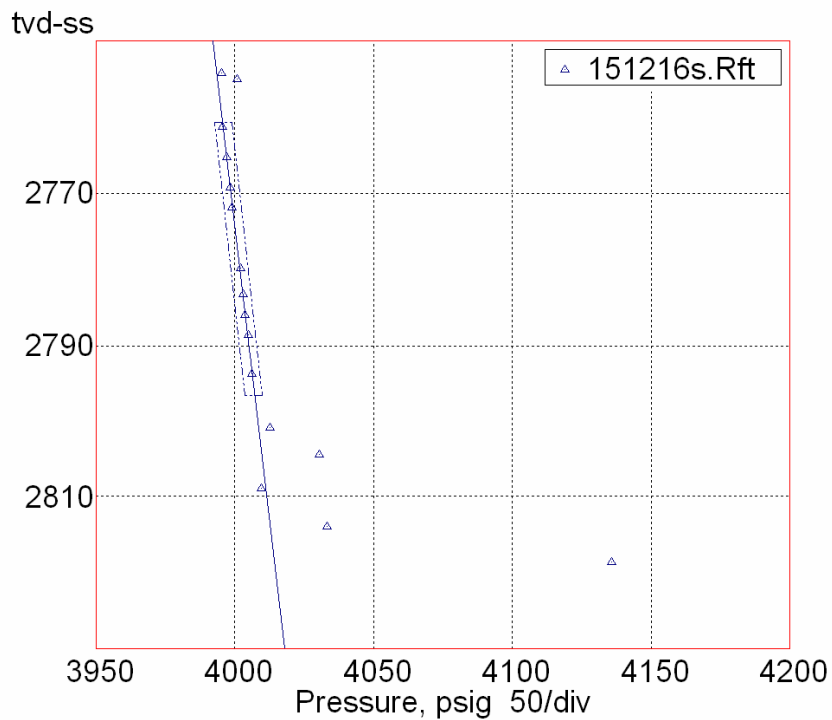
7.7 MDT Pressure Evaluation

19 pressure measurements were made in the Oxfordian, with 16 points considered to be valid for plotting.

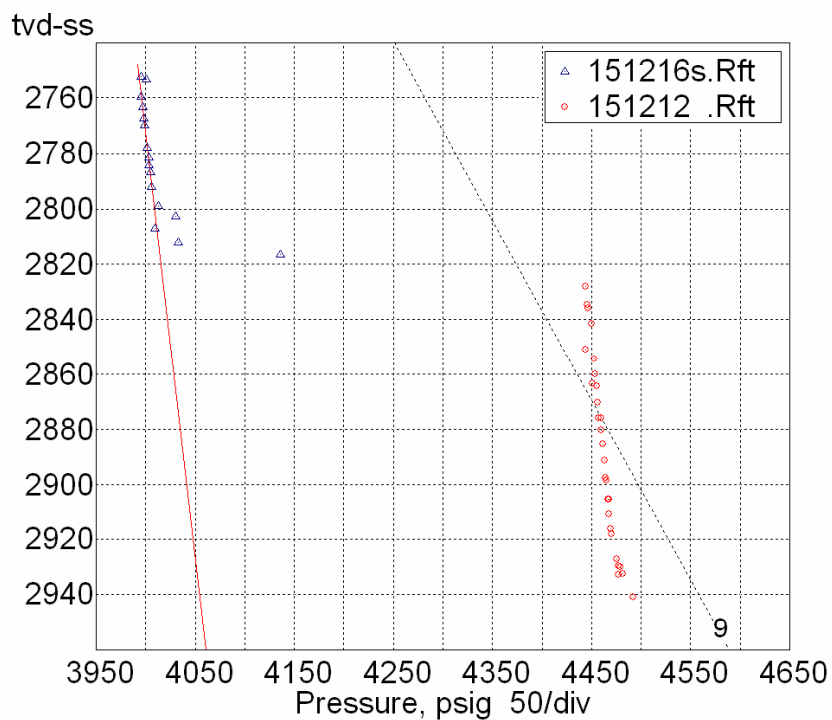
The formation pressure plot shows that the Oxfordian has been depleted by 400 psi in a uniform manner through most of the reservoir. This depletion has occurred through production from the Varg field, depleting the common aquifer pressure. The gas gradient over Varg South has not changed.

FORMATION PRESSURE DATA																			Operator: Talisman Energy Norge AS		
Well: 15/12-16 S					Run no.: W1.3 MDT/GR			Rig: M. Giant				Press. Unit: PSIA		MSL-RKB	39.5	Logging Company: Schlumberger					
Date	13.03.06			ACTUAL DEPTH m		Initial Hydro. pres.		TIME 'hh:mm'		Time	Formation Pressures				Final Hydro. pres.		Gradient	Temp.	Mobility	Mobility	Comment
No.	Geo Zone	m MD	TVD RKB	TVD SS	Qtz Gauge	SG RKB	Set	Retract	Spent	PSIA	BARA	SG SS	SG RKB	Qtz Gauge	SG RKB	g/cc	deg. C	mD/cp	comment		
1	RZ1	2840.3	2790.7	2751.2	4404.20	1.109	14:40	14:44	0:04	4009.89	276.28	1.024	1.010	4398.46	1.108	4.54	107.0	46.7	Good	Pretest 60cc/min drawdown, max vol. 20cc.	
2	RZ1	2841.3	2791.6	2752.1	4397.30	1.107	14:50	14:57	0:07	4015.61	276.68	1.025	1.011	4397.70	1.107	-0.60	108.2	1.7	Moderate	60cc/min drawdown, 20cc.Slight tight	
3	RZ1	2848.3	2797.8	2758.3	4405.45	1.107	15:05	15:09	0:04	4010.32	276.31	1.022	1.007	4400.86	1.106	0.25	109.6	234.0	Very good	60cc/min drawdown, 20cc.Slight low drawdown.	
4	RZ1	2852.8	2801.8	2762.3	4408.68	1.106	15:17	15:20	0:03	4011.72	276.41	1.021	1.006	4406.30	1.105	0.22	110.5	3043.1	Very good	100cc/min drawdown, 20cc.Stable on 2 decim.	
5	RZ1	2857.3	2805.8	2766.3	4414.60	1.106	15:26	15:30	0:04	4012.96	276.49	1.020	1.005	4412.01	1.105	0.19	111.6	881.1	Very good	120cc/min drawdown, 20cc.	
6	RZ1	2860.3	2808.4	2768.9	4417.22	1.105	15:40	15:42	0:02	4013.69	276.54	1.019	1.004	4415.29	1.105	0.26	113.0	905.9	Very good	120cc/min drawdown, 20cc.	
7	RZ1	2869.3	2816.4	2776.9	4433.44	1.106	15:52	15:57	0:05	4016.61	276.74	1.017	1.002	4429.80	1.105	0.19	113.6	2394.7	Very good	120cc/min drawdown, 20cc.	
8	RZ1	2873.3	2819.9	2780.4	4435.82	1.106	16:03	16:08	0:05	4017.56	276.81	1.016	1.001	4432.74	1.105	0.20	114.3	2308.9	Very good	120cc/min drawdown, 20cc.	
9	RZ2	2876.3	2822.5	2783.0	4438.94	1.105	16:14	16:19	0:05	4018.31	276.86	1.015	1.001	4436.82	1.105	0.33	115.2	390.8	Very good	120cc/min drawdown, 20cc.	
10	RZ2	2879.3	2825.2	2785.7	4442.70	1.105	16:27	16:32	0:05	4019.54	276.95	1.014	1.000	4447.70	1.106	0.17	115.8	1101.1	Very good	120cc/min drawdown, 20cc.	
11	RZ3	2885.3	2830.5	2791.0	4454.40	1.106	16:38	16:44	0:06	4020.82	277.03	1.013	0.998	4450.07	1.105	0.65	116.6	190.2	Very good	120cc/min drawdown, 20cc.	
12	RZ3	2893.3	2837.5	2798.0	4465.90	1.106	16:51	16:59	0:08	4027.30	277.48	1.012	0.998	4459.50	1.105	3.53	118.2	2.8	Moderate	60cc/min drawdown, 20cc.Not stable on 1 PSI	
13	RZ3	2897.3	2841.0	2801.5	4468.50	1.105	17:09	17:17	0:08	4045.00	278.70	1.015	1.001	4464.23	1.104	-3.34	118.9	1.7	Moderate	40cc/min drawdown, 20cc.Not stable on 1 PSI	
14	RZ3	2902.3	2845.4	2805.9	4473.70	1.105	17:27	17:34	0:07	4024.10	277.26	1.008	0.994	4471.46	1.104		120.1	9.4	Moderate	40cc/min drawdown, 20cc.Stable on 1 decimal	
15	RZ3	2906.3	2849.0	2809.5	4479.30	1.105	17:46	17:52	0:06					4476.90	1.104		120.0			40cc/min drawdown, 10cc.Tight!	
16	RZ3	2908.3	2850.7	2811.2	4480.22	1.105	18:00	18:06	0:06							662.91	120.9			40cc/min drawdown, 10cc.Tight!	
17	RZ3	2913.3	2855.1	2815.6	4488.50	1.105	18:14	18:22	0:08	4150.50	285.97	1.036	1.022	4485.50	1.104		121.0	1.2	Moderate	40cc/min drawdown, 10cc.Stable on 1 decimal	
18	Skagerrak	2924	2864.5	2825.0	4500.80	1.104	18:44	18:50	0:06								121.7			40cc/min drawdown, 10cc. Lost seal twice.	
19	Skagerrak	2930.8	2870.5	2831.0	4514.10	1.105	18:52										122.0			30cc/min drawdown, 5cc. Tight	
20	Skagerrak	2936.2	2875.3	2835.8	4519.60	1.105	19:09	19:13	0:04					4516.75	1.104		122.5			20cc/min drawdown, 5cc. No seal trice.	
21	Skagerrak	2942.3	2880.6	2841.1	4528.00	1.105	19:19	19:26	0:07					4525.00	1.104		123.2			20-60cc/min drawdown, 5-10cc. No draw down.? Dam	
22	Skagerrak	2949.5	2886.9	2847.4	4541.20	1.106	19:30	19:34	0:04							-78.01	123.0			30cc/min drawdown, 10cc. No draw down.	
23	RZ3	2908.0	2850.5	2811.0	4473.60	1.103	19:51	19:58	0:07	4047.90	278.90	1.012	0.998	4475.30	1.103		122.8	24.7	Good	30cc/min, 10cc.Redo pre-test 16, sli diff. depth and tes	
24	RZ3	2906.1	2848.8	2809.3			20:05	20:08	0:03											30cc/min, 10cc.Redo pre-test 15.Still tight.	

Pressure Plot for 15/12-16S



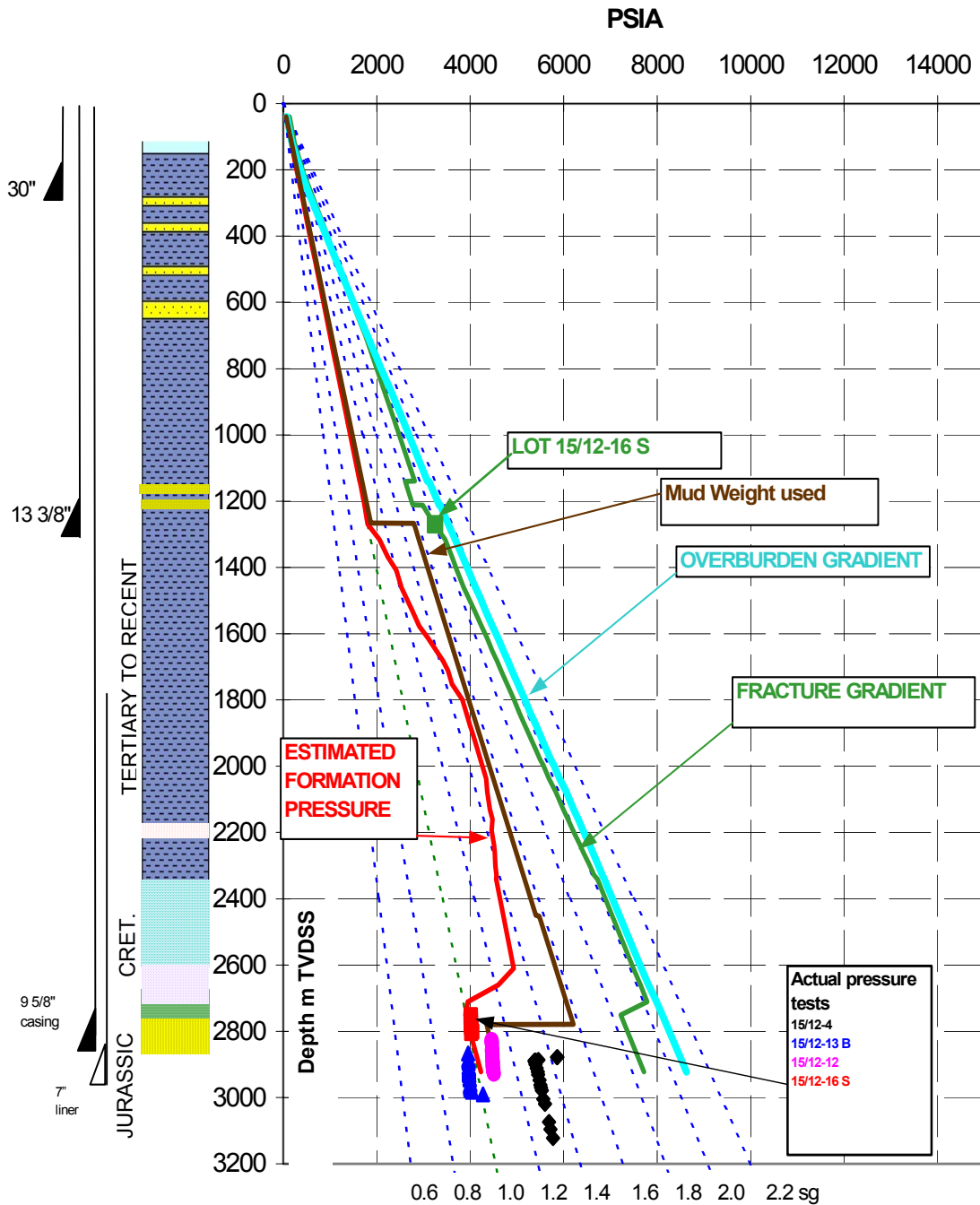
Gas gradient 0.099 psi/ft, 0.23 g/cc



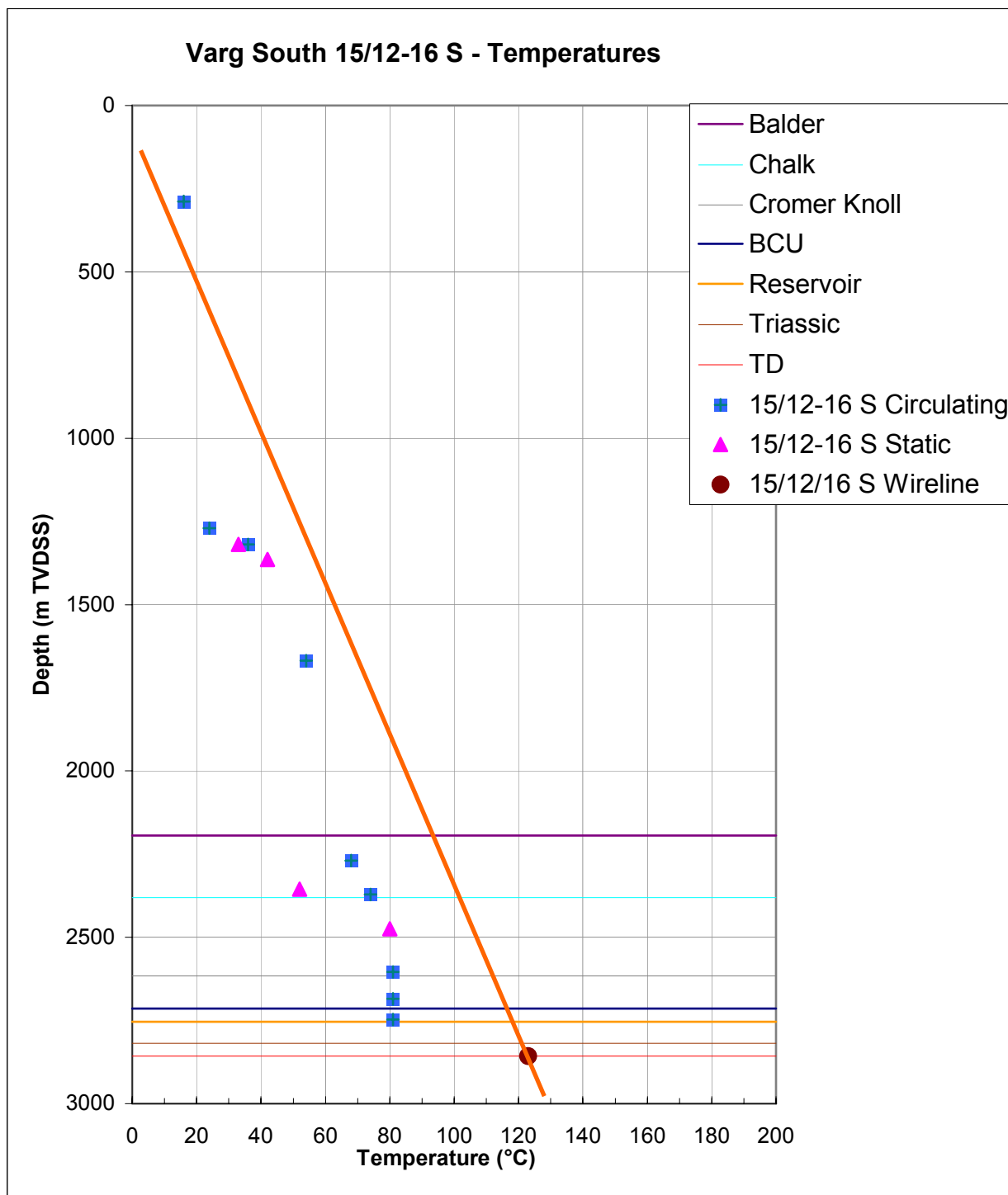
8.0 Pressure and Temperature discussion.

8.0 FORMATION PRESSURE AND TEMPERATURE DATA

8.1 Pore and fracture Pressure Profile with Overburden



Temperature Plot



8.5 Pressure discussion

The pore pressure was estimated to follow a normal gradient of 1.03 – 1.05 SG down to 1150m TVDSS.

A LOT of 1.80 SG was performed at 1273m TVDSS and the 12 ¼” section was then drilled with a MW of 1.55 SG.

From 1150m TVDSS the pore pressure started to rise and increased steadily within the Hordaland Group from around 1.20 SG at 1300m TVDSS to a maximum of 1.53 SG at 1760m TVDSS. The pressure continued at around 1.53 SG down to 2000m TVDSS, which corresponded to the start of the Eocene “Green Claystone Marker”, where it declined towards 1.46 SG. The pressure continued at around 1.46 SG in the “Green Claystone” and possibly also through the Balder and Sele formations before decreasing to 1.45 SG in the Lista. High gas values were observed within Balder Formation (peak of 16%) but these are related to the accumulation of hydrocarbons in stringers of fractured limestone and the silty texture of the tuffaceous claystone rather than pore pressure. Pressure estimates are for the most based on compaction trend lines and resistivities. The drilling exponent is of much less value whilst drilling with a Geopilot and PDC bit.

Upon entering the Shetland limestones, the resistivity readings were of limited value and Sperry Sun utilised the Sigma formula. A rise in Sigma values indicated that the pressures were decreasing and 1.35 SG was estimated for the Tor Formation at 2430m TVDSS.

High gas values were observed in the top of the Tor Formation with a maximum peak of 12%, recorded. These gases were associated with the presence of gas/condensate in fractured limestone at the top of the Tor Formation. The estimated pore pressure decreased to 1.33 SG at base of the limestones in the Shetland Group.

In the Cromer Knoll Group and the Draupne Formation the pore pressure decreased steadily down to 1.21 SG at top of the Heather Formation at 2743m TVDSS.

The pore pressure in the Upper Jurassic Oxfordian sandstone reservoir was on average around 1.00 SG between 2758m to 2815m TVDSS, measured by MDT.

Formation gas peaks of up to 15.6% were recorded by the Halliburton mudloggers in the reservoir at 2875m MD. Despite an increased level of background gas in the main reservoir, it was thought that these peaks were possibly the result of swabbing in gas whilst working the pipe to reduce ECD levels.

8.6 Temperature Discussion

The maximum down-hole temperature recorded was 123°C from the MDT run.

A theoretical temperature trend of around 3.8 °C /100m was prognosed for this well, this was based on offset wireline log data. The actual circulating temperature gradient was around 3.4 °C /100m.

There were very few static temperature measurements recorded, as there were so few bit runs. Static represents the highest temperature measured at TD when the MWD tools are back on bottom after a trip or running and setting casing. A round trip of

around 24 hours is not really long enough time-wise to obtain a value for the real static formation temperature. Temperature recorded after several days should be fairly close. The static temperatures are observed temperatures and not calculated static temperatures from Horner diagrams. The following static temperatures were noted with the MWD: 33°C at 1319m (1270.5m TVDSS), 42°C at 1365m (1315.6m TVDSS), 52°C at 2355m (2292.3m TVDSS), 80°C at 2474m (2410m TVDSS).

Other circulation temperatures observed while drilling were:

- 16°C at 328m (328m TVDSS)
- 24°C at 1319m (1270m TVDSS)
- 36°C at 1369m (1319m TVDSS)
- 54°C at 1723m (1669m TVDSS)
- 68°C at 2331m (2269m TVDSS)
- 74°C at 2435m (2371m TVDSS)
- 81°C at 2677m (2604m TVDSS)
- 81°C at 2766m (2685m TVDSS)
- 81°C at 2835m (2747m TVDSS)

9.0 Test Results.

1. Background

Varg South is a small gas condensate field located 6 km south of the Varg oilfield, Figure 1.1. The reservoir is the same Oxfordian shallow marine high quality sandstone that forms the reservoir at Varg itself, and the nearby Armada fields of Seymour, Drake, Hawkins, and Pi. The trap is a faulted anticline, structured over the crest of a north-south Zechstein salt wall.

The main structural elements of the field are shown on Figure 1.2. Prior to well 15/12-16S, the Western part of the field was already proven with two gas wells, one of which (15/12-12) was suspended as a potential producer, the other abandoned. Faulting increases towards the structural crest and this further appraisal/producer well is required in the Central block to bring it into the proven category.

Before 15/12-16S, No DST had been run on Varg South, and so full flow gas samples were required for confirming host facility requirements. The DST was also planned to determine reservoir continuity in the Central target area.

The pre- 15/12-16S reserves classification by reservoir segment are tabulated below:-

Area	Reserves		Total Reserves (MMboe)	Category
	Gas (BCF)	Oil (MMstb)		
West+Central +Crest	185	5.9	36.7	3P
West+Central	146	4.3	28.6	2P
West Only	99	3.1	19.6	1P

Success in 15/12-16S would bring the reserves in the Central Segment a probable category to proven. The Crest block may also be accessed by the new well if reservoir section is present over the crest of the salt dome, and if the fault transmissibility allows.

Previous well evidence indicates an original oil rim around 50m thick before Varg start up. As a result of aquifer depletion, gas expansion and remigration will have reduced the oil rim to an estimated 24m thick by January 2006. With this reduced thickness, and the difficulties in locating and producing it, the oil rim is considered to be non-commercial. Well 15/12-16S was not expected to encounter an oil leg.

2. Geology

Well 15/12-16S encountered top reservoir 70m high to prognosis, and encountered a reservoir section thinner than prognosed (83m MD vs 130m). Preliminary interpretation indicates that the top of the reservoir section is faulted out and that RZ2 is very condensed

Reservoir quality is slightly poorer than was prognosed but is still good. Reservoir development is different to wells 12 & 13B.

The areal extent of the 15/12-16S reservoir development is still to be properly assessed, though a quick look interpretation of the seismic volume shows indications that it could be limited to the crestal part of the Central Segment of the field.

To enable assessment of the potential impact of the well results on the development programme, quick look volumetrics have been conducted on the reservoir, allowing for different extents of the 15/12-16S property model throughout the Central Segment, see Figure 2.1. As may be seen, the Central Segment has been divided into three sub-segments, CN, CC and CS, and volumetrics have been calculated dependent on whether or not 15/12-16S properties are extrapolated throughout the sub-segments.

Given the levels of complexity observed in the 15/12-16S well test response, it appeared prudent to also examine the impact of full or partial compartmentalisation in the West Segment of the field. The was

divided first into two sub-segments, W1 and W2, to examine the impact of seal or baffle across NW to SE trending faults, and then further subdivided into four sub-segments W1N, W1S, W2N and W2S to examine the potential impact of SW to NE trending faults.

Results of the quick look analysis are shown in Table 2.1. Note that this formulation only includes Free Gas and does not allow for solution gas in the oil leg.

No further work has been conducted on the volumetrics for the Crest of the field, which have previously been included in the 'Possible' volumes, as it is not considered that the well results significantly impact the mapping over the Crestal area, although the high top reservoir in 15/12-16S may increase confidence in the presence of reservoir over the higher risk Crestal area.

3. MDT Results

After the well had reached TD, an MDT tool was run to ascertain the pressure trend in the reservoir. The results, compared with those from the previous two wells, are shown in Figure 3.1. The trend of the points is slightly higher than those from the 15/12-13B well, despite there being almost a three year time period in between the two wells. However, the pressure observed at the 15/12-16S well is not a major surprise. The pressure depletion profile at the Varg South field is believed to be largely governed by withdrawal from the southern fault block of the neighbouring Varg main field (production wells A11 and A15/A15A). During the first few years of production (December 1998 onwards), the production rate was high and in voidage terms, net production was high. Since June 2003 (when 15/12-13B was drilled), production has dropped off significantly in the southern portion of Varg main, whilst there has been significant increase in gas injection (well A11). The effect of all this has been that in the intervening three years between the two wells, there has been a slight net over-injection in the southern fault block. This explains why the reservoir pressure observed at 15/12-16S is slightly higher than that observed at 15/12-13B.

Figure 3.2 shows a comparison between the MDT pressure gradient and the pressure observed after the initial flowing period and associated build-up in the subsequent DST. As can be seen, there is very close agreement between the two, with the DST data lying on the pressure gradient from the MDT. This gives us added confidence that this pressure trend is an accurate representation of downhole conditions.

The MDT data also confirms the absence of any significant vertical barriers to flow, which could be expected to be observed on an MDT plot after such significant pressure depletion.

4. Testing Summary

Well 15/12-16S was an appraisal well drilled by the Maersk Giant to evaluate the central segment of the Varg South field. Varg South is operated by Talisman Energy Norge (70%) on behalf of itself and its Partner Petoro (30%). The well was spudded on 6th February, 2006 and reached a TD of 2961m MDBRT in 8½" hole on 12th March, 2006. The primary target of the well was the Oxfordian sandstone a member of the Viking group. The primary objectives of the well were to drill, test it for commercial quantities of hydrocarbons and, if successful, suspend for later completion as a gas producer. The specific objectives of the well test programme were:-

1. Determine the well productivity (insitu kh, skin and AOF)
2. Determine initial reservoir pressure
3. Determine peak rate flow
4. Investigate for nearby boundaries (reservoir compartmentalization).
5. Determine if there is any reservoir depletion
6. Collect representative separator PVT samples. Collect samples for analysis of H₂S, CO₂, mercaptans and mercury.

The interval (2850 – 2884 m MDBRT) was perforated using 4 5/8" guns with 12 SPF at 30° phasing and 22.7g charges. The test string was run with a cushion of inhibited seawater and pressured to 6312 psia at surface to give an underbalance of 2177 psi.

The well was initially opened for an 11 minute flow against a 34/64" choke, for the initial flow period to determine initial reservoir pressure. No hydrocarbons were flowed to surface and a total of around 31 bbls fluid were returned. The well was then shut-in for around 8.2 hours (partly for operational reasons).

The clean-up flow commenced initially opened on a 12/64" choke, eventually opening to a 72/64" choke. The maximum gas rate recorded during this time was 42MMscf/d with an average CGR of around 49 bbls/MMSCF. After the clean-up flow period, the well was shut-in for approximately 13 hours, during which a preliminary well test interpretation was carried out.

The well was then opened again on a 72/64" choke for the main flow period, which lasted 27.4 hours, flowing at a steady rate of 42 MMscf/d. Extensive sampling was carried during this period, to help determine PVT parameters and the level of potential contaminants for flow assurance purposes. The well was then shut-in for 24.6 hours for the interpretation of the pressure build-up data.

A further flow period was carried out for the purposes of further PVT sampling and also to flow the well at a different rate to determine the non-Darcy skin, which is necessary for gas wells.

	Initial Flow	Initial PBU	Cleanup Flow	Cleanup PBU	Main Flow	Main PBU	Sampling Flow
Duration (hours)	0.17	8.2	12.7	13.0	27.4	24.6	5.2
Choke size 64ths	-----	-----	Various	-----	72	-----	48
Final THP (psia)	1592	1694	1977	3066	2013	3058	2702
Final BHP (psia)	3993	4010	3938	4002	3922	3997	3961
Average Gas Flow Rate (MMscf/d)	-----	-----	38.8	-----	42.1	-----	27.9
Average CGR (bbl/MMscf)	-----	-----	48.8	-----	49.7	-----	47.6
Average WGR (bbl/MMscf)	-----	-----	0.64	-----	0.51	-----	0.94
H ₂ S (ppm)	-----	-----	1.7	-----	2.1	-----	2.1
CO ₂ (%)	-----	-----	2.0	-----	2.0	-----	2.2

Table 4.1 Summary of Main Flowing & Build-up Periods

All shut-ins were carried out downhole, eliminating the problem of wellbore storage from the well test interpretation.

The main focus of the interpretation was on the log-log derivative plot, which can be a very useful tool for information regarding reservoir shape and potential boundaries. Two slightly different matches were obtained for this data; as displayed in Figures 4.1 - 4.2. Overlaying onto the most likely top structure map, these correspond to two slightly different interpretations as follows:-

Match 1 (Rectangular Model)

Fault 1 (West):- 23m
 Fault 2 (North):- 110m
 Fault 3 (East):- 246m
 Fault 4 (South):- 1300m

Match 2 (Parallel Faults Model)

Fault 1 (West):- 19m
 Fault 2 (East):- 273m

In both these cases, at least one, maybe more, faults were probably only partially sealing. Figures 4.3 - 4.4 show the corresponding matches for the linear (pressure vs time) data. As can be seen, there were

problems with the match for the rectangular model, with the simulation showing far more depletion than actually observed in the field. This would indicate the simulated match contained a far too compartmentalized system. In order to match the linear data, it was necessary to have a more “open” system, which had the corresponding effect of knocking off the log-log derivative match (Figures 4.4 & 4.2).

To summarise, the linear data required a more open system, whilst the log-log derivative data required a more closed system. It was not possible to find a model that matched both the linear data and the log-log derivative data. Reality most likely lies somewhere between the two, i.e. some or all of the faults are partially sealing and the reservoir is not a perfect rectangle, but is a more hourglass shape, with the narrow “neck” around the well. One of other ‘bulb’ of the hourglass is likely to be baffled from the well. Current seismic interpretation indicates the isolated area may be to the North of the well.

Tying this with the geological model, suggests that there is high confidence that the well should be able to drain the reserves to the south of the well. There is a good chance that some or all of the reserves to the north may also be drained, though for this case the probability is reduced from pre-drill levels.

In order to try and assess the connected GIIP, a simple material balance exercise was carried out. This method used the final built-up pressure from each PBU, in lieu of an average reservoir pressure, to perform an analysis of P/Z vs. cumulative gas produced. This is clearly pessimistic as the pressures were still building at the end of the PBU, and so the method will yield a minimum connected GIIP. This analysis can be seen in Figure 4.5, indicating a minimum connected GIIP of 17 BCF. One further step, was to back-calculate the final built-up pressures from a range of assumed GIIP, as shown in Figures 4.6. This would indicate that a connected GIIP in the range 17 – 30 BCF is credible.

The semi-log plot can be used to derive the main reservoir parameters. The values derived from the main build-up are shown in Table 4.2:-

Parameter	Value
P* (psia)	4013
Kh (mDft)	55500
K (mD)	235
S	1.6

Table 4.2: Reservoir Parameters from Semilog Analysis

The value of p* from the main build-up compares favourably with the values derived from the initial and clean-up build-ups. In both cases this value was 4010 psia. This clearly indicates no evidence of depletion, Figures 4.7 to 4.9.

It should be emphasized that the results are tentative and we are still awaiting final reports from the relevant service companies. In particular, at the time of writing, there is still some ambiguity over the reporting of oil and gas rates.

During the test a total of 63 samples were collected. A brief summary of the samples collected is as follows:-

Samples during Clean-Up Flow:

Pressurised Samples:

- 2 x Separator PVT sets (1 x litre condensate + 2 x 20 litre gas)
- 2 x Isokinetic gas samples (20 litre wet gas)

Samples during Main Flow

Pressurised Samples:

- 2 x Separator PVT sets (1 x 1 litre condensate + 2 x 20 litre gas)
- 2 x Isokinetic gas samples (20 litre wet gas)
- 3 x Geochemical gas samples for onshore analysis of CS₂, mercaptans and mercury.

Atmospheric Samples:

- 2 x condensate in 5 litre cans.
- 2 x water in 1 litre plastic bottles.

1 x condensate in 200 litre drum.
Back-up samples of water and condensate in 1 litre plastic bottles.
1 x 200ml scrubbing solution for arsenic analysis.

Samples during Sampling Flow:

Pressurised Samples:

2 x Separator PVT sets (1 x litre condensate + 2 x 20 litre gas)
2 x Isokinetic gas samples (20 litre wet gas)

Atmospheric Samples:

2 x condensate in 5 litre cans
2 x condensate in 1 litre aluminium bottles.
5 x water in 1 litre plastic bottles.

A summary of the sampling results is shown in Table 4.3. Analysis of the water suggested strongly that it was condensed water.

Parameter	Value
Gas gravity	0.692
Oil gravity (°API)	52.3
H ₂ S (ppm)	2
CO ₂ (vol %)	2
Mercury (µg/m ³)	0.19
Radon (Bq/m ³)	63

Table 4.3 Summary of Fluid Properties

5. Reservoir Performance Prediction

Following the unexpected structural outcome in 15/12-16S, there was a pressing need to quickly assess the potential impact on the Varg South development and its economic metrics. Re-interpretation of the seismic, 3D-model rebuild and re-simulation was too time consuming to deliver results in the necessary time frame, and so a simple dry gas material balance and well/flowline hydraulics analysis was utilized to forecast the production profile from a range of Free Gas In Place scenarios, from the quick look volumetric analysis previously discussed. Condensate-gas ratios, and hence condensate production rates were then estimated from previous simulation results, based on the average reservoir pressure.

In line with the current stage of contractual negotiations, gas compression is scheduled to commence on 1 October 2009. In some of the low GIIP cases, the simple model was unable to converge in the period leading up to this time, and it was necessary to advance the compression onset, consistent with the concept of 'best endeavours' at Armada.

The range of cases studied is tabulated below, 'New' refers to propagation of 15/12-16S properties throughout a polygon, 'Old' refers to use of pre-15/12-16S properties.

Case	GIIP Bscf	No. Wells	Central Description	West Description
C	147	2	New CC, New CS and New CN.	W1 and W2
D	108	2	New CCC, New CS and New CN.	W2 only
E	90	2	New CC, old CS, old CN.	W2S only
F	83	2	New CC, Old CS,.	W2 only
K	160	2	Adjusted volumetrics for consistency with Simulation model volumes and results	W1 and W2, adjusted for consistency with simulation results
Alt C	147	3	As C. Third well to access one of CN or W2N and comp after 18 months	
Alt E	90	3	As E. Third well to access CN and comp after 18 months	W2S only
Alt C2	147	4	New C, one new well to access CN	Old W2, second new well to access W2N

Production Profiles for these cases are shown in Figure 5.1.

Simulation based profiles have also been developed for a more limited number of cases, as shown in Figure 5.2. To date, these profiles have not yet been updated for the newly negotiated onset of compression on 1 October 2009 or with the results of the 15/12-16S well. A brief description of the simulation cases is as follows:-

Downside Case – This model is the same as the “west+central” case, with the difference that the majority of the faults are given a fault transmissibility multiplier of 0.001, increasing the degree of compartmentalization in the reservoir.

West + Central – This represents the base case, assuming the western compartment to be drained by well 15/12-12 and the central compartment to be drained by 15/12-16S. The 15/12-16S well is assumed to be in full communication with the whole of the central compartment. The crestal region is assumed to be absent.

West + Central + Crest – This is an upside case, assuming that the crestal region to be present in addition to the west and the central. It is assumed that this area would be drained by the 15/12-16S well.

West + Central + Crest + East – This case is a further upside case, representing a three well development. In addition to the 15/12-12 and 15/12-16S wells, it is assumed that there would be a further well in the eastern compartment.

6. Economic Evaluation

Quick look production forecasts have been combined with the most recent development cost estimates to provide economic metrics NPV and DPI. To date not all of the cases described above have been studied.

Economic metrics are presented in the table below, and in Figures 6.1 and 6.2.

It may be seen that NPV is positive down to net gas reserves of 50Bscf, but that economic metrics of a downside outcome may be significantly improved by infill drilling to access additional gas reserves not directly developed by the original two production wells.

Varg South Economics - Armada Option

Varg South via Armada - 70% TLM equity £mm	Liquids Reserves (mmbbls)	Gas Reserves (BCF)	Total Reserves (mmboe)	NPV 6% REAL	Capex 6% REAL	DPI 6% REAL	Abandon. Date
<u>"1P" Case - (77BCF / 1.7mmbbls technical recoverable), 2 wells, 1198MM NOK Facs/Subsea</u>							
1P	1.2	50.2	9.6	10.3	108.4	0.09	2010.5
<u>"2P" Case - (138BCF / 4mmbbls technical recoverable), 2 wells, 1198MM NOK Facs/Subsea</u>							
2P	2.8	88.8	17.6	39.5	107.4	0.37	2013.0
<u>"3P" Case - West + Central + East (260BCF / 8.3mmbbls technical recoverable) 3 wells, 1198MM NOK Facs/Subsea plus 102MM NOK for third well subsea costs</u>							
3P	5.6	154.5	31.4	82.3	123.1	0.67	2015.0
<u>Sensitivity</u>							
<u>"2P" Case - (138BCF / 4mmbbls technical recoverable), 3 wells, 1198MM NOK Facs/Subsea</u>							
2P	2.8	88.8	17.6	36.3	119.6	0.30	2013.0

Evaluation Start Date: 1st January 2006

Reference liquids price: 2006 FEE (Dtd Brent) less % NGL differential assumption

Gas price assumptions (p/therm MOD)		FEE IPE M-1 less 2p/therm Entry / Capacity
2006		38.58
2007		36.00
2008		33.00
2009		33.00
2010		36.00
2011		36.76
2012		37.54
2013		39.13
Tariff Assumptions (Real 2006 terms)		
Armada NGL Tariff	1.39	£/bbl
Everest NGL Tariff	0.47	£/bbl
FPS NGL Tariff	0.75	£/bbl
Armada Gas Tariff 1	0.21	£/mcf
Armada Gas Tariff 2	0.14	£/mcf
CATS Gas Tariff	0.36	£/mcf

Armada OPEX share at 110% from 1 Jan 2011 onwards (Opex / Armada profiles from Woodmac)

Abandonment cost - 150 mm NOK (100% gross)

7. Conclusions and Recommendations

Preliminary analysis of the well test data shows that

- Depletion at 15/12-16S has been limited by gas injection at well A14 in the Varg field.
- The 15/12-16S well encountered Oxfordian reservoir higher than prognosis and with thinner section than prognosis.
- DST flow confirmed high quality, high deliverability reservoir in Varg South.
- The DST analysis confirmed that the Varg South field is likely to be complex due to structural movement over the salt dome.
- GIIP directly connected to the 15/12-16S well was estimated to be at the very least 17Bscf, with potential up to 30Bscf. Additional volumes may be drained by the well through baffled or indirect connections.
- Field production forecasts post 15/12-16S results show that reservoir complexity, and hence poor connectivity can significantly impact field economics, but that a credible downside case is still robust. Economics of poorly connected outcomes can be significantly improved by infill drilling.
- Upside potential exists in the East Flank. Planning for exploration drilling is ongoing.

The well was suspended for subsequent use as a Varg South gas producer.

It is recommended that:-

- Planning for full field development be continued on the same basis as pre-well.
- The Varg South seismic is re-interpreted based on the new well outcome.
- Following seismic interpretation 3D and simulation modelling are carried out to provide a robust planning tool for field management.

- Intervention strategies to mitigate downside outcomes are given consideration in the time available before first gas.

10.0 Hole Section Operations Summaries

10 Hole Section Operations Summaries

Operation commenced Feb 3rd 2006 at 00:00 when rig left Hummer (1/2-2) 500 m safety zone and finished April 14th 2006 at 23:30 when rig was towed outside Varg S (15/12-16 S) 500 m safety zone.

10.1 Transit

Total time used:	46.5 hrs.
Operational time:	46.5 hrs.
Downtime:	0.0 hrs.

Left Hummer 1/2-2 well location and performed the sea voyage to 15/12-16 S. Positioned the rig at 50 m stand off location and jacked legs down to a hull draft of 3 m. Ran anchors and pulled rig into final position. Jacked up rig to 3 m air gap and performed preload test. Dumped preload and jacked up rig to final air gap of 18.5 m.

10.2 36" Section

Total time used:	255.5 hrs.
Operational time:	155.5 hrs.
Downtime:	100.0 hrs.

Skidded rig to final drilling position.

Ran in hole with 36" BHA and drilled 36" hole (using a 17 1/2" bit -26"/36" hole opener, mud motor and underdrift tool) from 127 m to 189 m using seawater and hi-vis bentonite pills. Got a final inclination of 1 deg. Boulders were encountered at 144 m and from 176-189 m. Circulated bottoms up and displaced well to 1.50 sg bentonite mud. Performed wiper trip to 10 m below seabed and RIH to TD. Observed 4 m fill. Circulated 2 x 15 m3 hi-vis pills, circulated bottoms up and displaced hole to 1.50 sg bentonite mud. POOH.

Waited on weather for 29 hrs.

Prior to running 30" conductor, the hole conditions were verified with a drift run using the 36" BHA. ROV was used to guide the BHA into the 36" hole. Stood up at 146 m, pulled up 4 m and washed down from 142 m to 170 m. Performed short wiper trip from 142 m with no circulation or rotation, all ok. Stood up at 171 m, washed down to TD, observed 1 m fill at TD. Circulated hole 2 times bottoms up, displaced hole to 1.50 sg bentonite mud and pulled out of hole.

Ran the 30" conductor (shoe at 186.9 m), worked conductor down from 181 m. Confirmed measurement from top of conductor to bottom of tension ring and Lynx connector approx 42" above seabed. Landed conductor in tension frame.

Ran in hole with 5 ½" cement stinger and stung into float. Mixed and pumped 64 m3 of 1.52 sg cement slurry. Pulled 5 ½" cement stinger.

Cut 30" conductor 3.305 m above tension ring.

Rigged up low pressure riser and diverter system.

Ran in hole with 17 ½" BHA (17 ½" roller cone bit and MWD) and tagged hard cement at 183 m. Drilled out cement and 20" shoe track, observed flow from outside of the 30" conductor with ROV. Drilled 3 m new formation with total losses. Drilled 17 ½" hole to 207 m with no returns.

Ran in hole with 5 ½" cement stinger to 206 m. Mixed and pumped 16 m3 of 1.95 sg cement slurry. Pulled out to 140 m and flushed DP, pumped 12 m3 seawater. POOH.

Ran in hole with 17 ½" BHA to 161 m. Attempted to fill riser, observed down hole losses (60 m3/hrs). Washed down from 161 m to 186 m, tagged cement. Drilled cement from 186 m to 187 m, POOH.

Ran in hole with 5 ½" cement stinger to 186 m. Mixed and pumped 30 m3 of lead 1.56 sg cement slurry. Positioned cement stinger above top of lead slurry. Mixed and pumped 12 m3 1.95 sg tail cement slurry. Pulled above the cement and flushed stinger.

Filled riser in steps to displace the cement out of conductor. Closed diverter element and displaced/squeezed cement in place, total 3.7 m3. Observed fluid level inside conductor fell back to sea level. POOH with cement stinger.

Ran in hole with 17 ½" BHA to 175 m. Washed down from 175 m to 185 m. Tagged top of cement at 185 m, drilled cement to 197 m (observed losses: 3-15 m3/hrs). Spotted a 10 m3 LCM pill (308 kg/m3) on bottom. Pulled above LCM pill and monitored well, static losses: 5.5 m3/hrs. POOH.

Ran back with 17 ½" BHA (with drilling jar), washed down to top of cement at 197 m. Drilled firm cement to 215 m, loss rate: 12.5 m3/hrs. Circulated bottoms up and POOH.

Ran in hole with 5 ½" cement stinger to 197 m. Mixed and pumped 17 m3 of 1.95 sg cement slurry. Observed fluid level increased from 45 m to 8 m inside conductor during pumping of cement. Filled up conductor with seawater. Pulled to above cement with cement stinger and flushed same. POOH.

Made up and ran in hole with 24" clean out assembly to 142 m. Washed down from 142 m to 181 m, no firm cement observed. Circulated out green cement and POOH.

10.3 17 ½" SECTION

Total time used: 221.5 hrs.

Operational time: 153.5 hrs.

Downtime: 68.0 hrs.

Ran in hole with 17 ½" BHA (17 ½" roller cone bit, no motor), washed down to top of cement at 181 m. Drilled firm cement down to 215 m.

Drilled and oriented 17 ½" hole from 215 m to 1243 m using seawater and hi-vis pills to control ECD (circulated hole clean at 472 m, 646 m and at 1021 m). Continued drilling and orienting 17 ½" hole from 1243 m to 1319 m. Circulated hole clean at 1165 m due to increased torque and drag on connections. Displaced hole to 1.09 sg KCl mud while drilling from 1224 m to 1253 m. Increased mud weight from 1.09 sg to 1.20 sg at 1319 m.

Performed flow check and pull out of hole, hole in general good condition. (Observed some tight spots between 650 – 700 m).

Ran in hole with 13 3/8" casing, landed 13 3/8" casing at mud line hanger (casing shoe at 1312.7 m). Pressured up tension system to 180 tons, no movement observed when landing casing.

Cemented 13 3/8" casing by pumping 101 m3 1.56 sg lead cement slurry followed by 20 m3 1.92 sg tail slurry. Displaced cement and bumped top plug after 6214 strokes (97% eff). No losses during pumping and displacement of cement. Pressure tested 13 3/8" casing 210 bar/10 min, ok. Opened up mud line hanger circulation ports and circulated clean above circulation ports. Closed mud line hanger circulation ports. To confirm closed ports, pressure tested 13 3/8" casing to 210 bar/10 min, ok.

Pulled 13 3/8" landing string. Mud line hanger running tool was still attached to mud line hanger and one joint of 13 3/8" casing. (fish in hole: mud line hanger running tool and 1 joint of 13 3/8" casing).

Nippled down diverter system, low pressure riser and overshot.

Observed crater around 30" conductor, performed grouting job: Ran in hole with 3 ½" cement stinger and entered crater outside 30" conductor, ran in hole with same to 142 m (15.5 m below seabed). Mixed and pumped 49 m3 1.95 sg cement slurry (observed cement out of crater after 40 m3 pumped).

Ran in hole with fishing assembly, engaged fish (mud line hanger running tool and 1 joint of 13 3/8" casing), pulled out of hole and laid down same.

Ran in hole with mud line hanger running tool and engaged same. Pressure tested 13 3/8" casing to 210 bar, ok. Backed out surface hanger running tool. Picked up wellhead and soft landed same. Made up wellhead and tested Pos Grip Seal to 69 bar; ok. Performed

25 tons over-pull test and adjusted split ring. Released wellhead running tool and POOH with same.

10.4 12 ¼" section

Total time used: 329.0 hrs.

Operational time: 250.5 hrs.

Downtime: 78.5 hrs.

Nippled up BOP.

Ran the 12 ¼" bottom hole assembly consisting of a 12 ¼" PDC bit and Geopilot. Tagged float at 1276 m. Drilled out float, cement, rat hole and 3 m new formation to 1322 m. Circulated until equal mud weight in/out: 1.20 sg.

Performed LOT to 1.80 sg equivalent mud weight.

Displaced well to 1.55 sg Performadril WBM. Drilled 12 ¼" hole from 1322 m to 1365 m.

Not able to steer Geopilot, POOH and changed same.

Drilled 12 ¼" hole from 1365 m to 1369 m, hole packed off. Established full circulation, observed large amounts of cuttings/cavings in pulses (pack off tendencies). Circulated hole clean. Drilled 12 ¼" hole from 1369 m to 1381 m, hole packed off. Established circulation rate. Drilled 12 ¼" hole from 1381 m to 1406 m, pulled 12 ¼" BHA into 13 3/8" shoe (got 20-30 tons over pull from 1350 m to 13 3/8" shoe at 1312 m).

Repaired iron rough neck.

Ran back to bottom with 12 ¼" BHA (observed 2 m fill). Drilled 12 ¼" hole from 1406 m to 1466 m. Packed off at 1428 m, got partly stuck at 1466 m (pulled with 25 tons overpull, got free). Re-established circulation rate and drilled 12 ¼" hole from 1466 m to 2331 m. Packed off at 1492 m and 1498 m. (Minor and steady (0.5%) amounts of splintered cavings observed from 1577 m to 2300 m).

Drilled 12 ¼" hole from 2331 m to 2355 m. ROP dropped when drilled from 2343 m to 2355 m (1.8 m/hrs). (Observed small (1%) and steady amounts of splintered cavings).

Pulled out of hole and changed bit (to 9 bladed Geopilot PDC bit), observed spots with over pull from 2115 m to 1519 m (max 20 tons). Ran back to TD with new bit, washed down at tight spots (2017 m and 2187 m).

Drilled 12 ¼" hole from 2355 m to 2474 m. (Observed small amounts of splintered cavings from 2404-2442 m). Geopilot failed at 2442 m, decided to continue drilling into Shetland to verify drillability. Circulated hole clean and weighted up mud from 1.55 sg to 1.57 sg.

Pulled out of hole and changed Geopilot and flex joint (same bit as previously). Tight spots observed: 2012-1980 m (15 ton over pull), at 1787 m and 1705 m (10 tons over pull), 1500-1292 m (20 tons over pull). Ran back to TD, washed down tight intervals.

Drilled 12 ¼" hole from 2474 m to 2766 m.

Jumper hose on top drive bursted, POOH to inside the 13 3/8" shoe, some tight spots observed. Changed out jumper hose with 1502 hard-piping and ran back to bottom with 12 ¼" BHA, reamed tight spots.

Drilled 12 ¼" hole from 2766 m to 2835 m (TD).

Circulated hole clean and weighted up mud weight to 1.59 sg. POOH (no tight spots).

Washed/jetted wear bushing setting area.

Ran in hole with 9 5/8" casing, landed same in mud line hanger (shoe at 2825.8 m).

Cemented 9 5/8" casing by pumping 13.6 m³ 1.65 sg lead cement followed by 13.3 m³ 1.9 sg tail cement slurry. Displaced cement with max allowed strokes (including ½ shoetrack and 96 % eff) without bumping the plug. Confirmed float holding.

Activated and sat the surface hanger gripping system.

Washed/jetted the 9 5/8" seal assembly setting area.

Sat 9 5/8" seal assembly and 9 5/8" wear bushing.

Pressure tested 9 5/8" casing to 345 bar/10 min, ok.

10.5 8 ½" SECTION

Total time used: 101.0 hrs.

Operational time: 93.5 hrs.

Downtime: 7.5 hrs

10.5.1 Drilling

Ran in hole with 8 ½" BHA (PCD bit and rotary non-steerable assembly), tagged hard cement at 2597 m.

Drilled out hard cement inside 9 5/8" casing from 2597 m while displaced to 1.10 sg BARADRIL-N WBM. Drilled out cement, float, shoe track and 3 m new formation to 2838 m.

Circulated hole until equal mud weight in/out: 1.09 sg.

Performed FIT to 1.20 sg EMW.

Drilled 8 1/2" hole from 2838 m to 2875 m, pulled back into 9 5/8" shoe and circulated hole (due to high ECD: 1.27 sg, dropped back to 1.22 sg)

Ran back to TD and drilled 8 1/2" hole from 2875 m to 2961 m (TD).

Circulated hole clean and pulled out of hole, no tight spots observed.

10.5.2 Logging

Rigged up wireline equipment.

Performed wireline log #1: AIT/DSI/GR log according to program.

Performed wireline log #2: LDS/APS/GR log according to program.

Performed wireline log #3: MDT/GR, performed stick test at 2855 m. No sticking observed when coming off the wall. Recorded pressure tests according to program. (Made 24 attempts and obtained 16 good records).

Waited on weather for 7 hrs.

Performed wireline log #4: Logged VSP according to the program from TD to 500 m.

10.6 Well testing

Total time used: 346.0 hrs.

Operational time: 312.0 hrs.

Downtime: 34.0 hrs

Well test summary located in Chapter 9.0 Test Results.

10.7 Liner

Picked up and ran in hole with 7" liner. Ran 7" liner on 5 1/2" landing string to 2956 m. Pack off tendencies. Spaced out landing string (7" liner shoe at 2955 m). Set hanger (after 3rd ball dropped) with 132 bar, sat down 20 tons on the hanger, ok. Shared out the ball seat and circulated 2 times bottoms up.

Pumped 15 m3 1.50 sg spacer, dropped bottom dart and pumped 5 m3 of 1.9 sg cement slurry. Dropped top dart and displaced cement by pumping 1 m3 of 1.5 sg spacer followed by 1.1 sg mud. Bumped top plug and pumped up pressure to 185 bar.

Pressure tested liner to 345 bar/10 min, ok. No backflow observed.

Released liner hanger running tool, and reverse circulated out excess cement. POOH with landing string.

10.8 Well cleaning

Ran in hole with 7" liner clean out/scraping assembly (3 ½" DP to enter liner).

Scraped test packer setting area from 2806 m to 2830 m.

Ran in hole and tagged top of liner with top dress mill (top of liner 2738.3 m). Opened and closed multi functional circulation tool. Washed liner by pumping wash train, displaced same with seawater, opened multi functional circulation tool (above 7" liner top) and continued displacing out wash train with seawater while rotating string.

Cleaned out well with seawater (until NTU<200), closed multi functional circulation tool and displaced well to inhibited seawater.

POOH with 7" liner clean out/scraping assembly.

Pressure tested well to 345 bar/10 min, ok.

Pulled 9 5/8" wear bushing.

Jetted the BOP wellhead (including a 9 5/8" well protector) and riser. Collected 23 kg of debris from the well protector.

Sat 9 5/8" wear bushing.

10.9 Logging

Rigged up wireline equipment.

Wireline run #1: Logged CBL/GR/CCL from 2904 m to 2000 m. (Not able to conclude top of cement in the 9 5/8" csg due to tool set up primary for logging 7" liner)

POOH and rigged down wireline equipment.

10.10 Well testing

Prepared test string equipment.

Picked up and ran in hole with the test string BHA (including perforating guns) to 388 m.

Pressure tested test string to 345 bar/10 min, ok.

Ran in hole with test string to 2886 m, installed acoustic telemetry transmitters as pr tally.

Rigged up electric wireline equipment. Ran in hole with tool string (GR-CCL) on wireline, correlated test string depth according to perforation interval. POOH and rigged down electric wireline equipment.

Spaced out and ran in with test string to 2870 m, pressure tested test string to 345 bar/10 min, ok. Installed BOP safety valve (including chemical injection line) and ran in hole to space out depth (2980 m, bottom shot TCP guns).

Installed surface test tree.

Pressure tested complete test string and chemical injection line to 345 bar/10 min, ok. Closed BOP safety valve and inflow tested same to 310 bar/10 min, ok.

Sat 7" Retrievable packer (by turning 3 times clockwise), confirmed set by lowering test string and observed 18 tons less string weight.

Closed lower pipe ram around test string slick joint. Pressured up annulus to 35 bar and sheared out tester valve to open position. Pressure tested packer from above to 85 bar/ 10 min, ok.

Flushed and pressure tested production surface line to 345 bar/10 min, ok. Inflow tested check valve on kill line to 300 bar/10 min, ok.

Closed select tester valve (by pressuring up annulus to 165 bar/15 min and opened OMNI valve into circulation position (by increased annulus pressure to 250 bar and bled off).

Displaced tubing to base oil and cycled OMNI valve into well test position.

To keep select tester valve in open position, pressured up annulus pressure to 85 bar.

Fired guns by applying 325 bar down string, held pressure for 15 min and bled down to 15 bar before guns fired. Got good indication of fired guns (tubing pressure increased from 15 to 47 bar).

Opened production choke and flowed back 4 m3 to the calibration tank. Closed select tester valve (by bleeding off annulus pressure). Flowed 1.5 m3 back before shutting in the well at the choke. Shut in wellhead pressure: 107 bar.

Prepared for flaring.

Performed clean up flow: Opened select tester valve (by applying 85 bar on annulus), opened well on choke and performed clean up flow. Gas and oil diverted to port burner boom for flaring off. Closed select tester valve (had to cycle into failsafe position, pressured up annulus to 170 bar, held for 15 min and bled off pressure). Closed choke. (Flowing pressure: 134 bar, shut in pressure: 104 bar).

Built up down hole pressure after clean up flow.

Performed main flow: Opened select tester valve and opened up well and choke. Oil and gas diverted to starboard burner boom for flaring off.

Attempted to change over from adjustable to fixed choke, not able to flow through fixed choke. Shut in well at select tester valve. Closed surface master and production wing valves. Repaired fixed choke.

Opened well and continued main flow period. Gas and oil diverted to starboard burner boom for flaring off. Increased flow rate and changed over from adjustable to fixed choke. Shut well in at select tester valve (did not close on first attempt, had to pressure up annulus to 180 bar for cycling valve into failsafe close position).

Built up down hole pressure after main flow test.

Performed sample flow: Opened well and performed sample flow period. Performed sampling according to program. Gas and oil diverted to starboard burner boom for flaring off. Closed select tester valve (two attempts, had to pressure up annulus to 180 bar and bled down again after 15 min). Bled off tubing pressure.

Filled tubing down to select tester valve with inhibited seawater. Opened select tester valve (applied 100 bar on annulus) and killed well by bull heading 80 m3 of inhibited seawater down tubing. Bled down pressure and flow checked, ok static. Closed select tester valve (annulus pressure: 180 bar/15 min). Closed BOP safety valve and flushed surface lines through well test system.

Rigged down well testing equipment and surface test tree.

Damaged 5 ½" FH x Hydril 563 x-over while stabbing in. Rigged up and pressure tested surface test tree, BOP safety valve closed. Cycled OMNI valve to well test position, attempted to open BOP safety valve, no go. Disconnected surface test tree and pumped through kill line and confirmed all valves open, concluded BOP safety valve failed in closed position.

Rigged down well testing equipment and surface test tree.

Unseated 7" retrievable packer and moved BOP safety valve to above BOP. Bullheaded 10 m3 inhibited seawater down annulus. Pulled out of hole with BOP safety valve above

rotary. Re-sat 7" retrievable packer. Closed annular and cycled OMNI valve to next blank position. Laid out BOP safety valve and cycled OMNI valve to circulation position.

Circulated inhibited seawater 1.5 times annulus volume (down tubing and up annulus), no gas observed.

Cycled OMNI valve to well test position. Locked open select tester valve. Bull headed 4 m³ LCM pill followed by 18 m³ inhibited seawater, bled down pressure from 217 bar to 10 bar.

Picked up 4 m to unseat 7" retrievable packer element. Performed flow check 15 min, ok static. Displaced well to 1.05 sg inhibited KCl/seawater kill fluid, no gas in returns, no losses. POOH with well test string (including guns, verified all guns fired).

10.11 Temporary plug & abandon

Total time used: 201.0 hrs.

Operational time: 156.5 hrs.

Downtime: 44.5 hrs

Ran in hole and sat Peak 9 5/8" VMB HP mechanical plug at 2697 m, pressure tested same (from above) with 315 bar/10 min, ok. Spotted a 3 m³ hi-vis plug above mechanical plug. POOH with running tool.

Ran in hole and sat 9 5/8" VBM LP mechanical plug at 497 m, pressure tested same (from above) to 315 bar/10 min ,ok.

Retrieved wear bushing.

Flushed seal assembly area between 9 5/8" and 13 3/8" casing. Released seal assembly, not able to retrieve seal assembly.

Ran in hole with 9 5/8" spear assembly, not able to enter 9 5/8" casing with spear. (friction elements dressed for 10 3/4" casing).

Made up new 9 5/8" spear (Itco), ran in hole and engaged same into 9 5/8" casing. Not able to unscrew mud line hanger. POOH with spear.

Ran in hole with torque tool, engaged same and unscrewed mud line hanger (13 times right hand turn, 10-12 kftlbs). POOH with torque tool.

Ran in hole with 9 5/8" (itco) spear, engaged same into 9 5/8" casing. Pulled 9 5/8" casing 2 m and circulated out mud between 13 3/8" and 9 5/8" casing. Pulled out of hole with spear and 9 5/8" casing above mud line hanger. Mud line hanger running tool was not attached to pulled 9 5/8" casing.

Attempted to fish mud line hanger running tool with 9 5/8" spear (itco), no success.

Ran in with mud line hanger torque tool, attached same into profile of mud line hanger, not able to rotate mud line hanger running tool. POOH with mud line hanger running tool. Discovered that torque tool was backed out at x-over to 4 1/2" IF.

Ran in hole with fishing assembly (10 1/8" overshoot / 6 3/4" grapple), tagged at 137 m, indicated fish passed through mud line hanger. POOH with fishing assembly.

Changed out overshoot fishing assembly to 7 7/8" overshoot with 6 3/4" grapple. Ran in hole with same, tagged fish at 492 m. Retrieved fish, POOH and laid down same (torque tool).

Made up torque tool, ran in hole and positioned torque tool into mud line hanger running tool. Turned 10 times clockwise (8-15 kftlbs) and POOH.

Picked up and ran in hole with 9 5/8" inline spear, located same inside mud line hanger running tool, not able to release mud line hanger running tool with rotation. Released inline 9 5/8" spear and POOH.

Ran in hole with torque tool, latched into profile and rotated mud line hanger running tool with 7-15 kftlbs. Picked up to neutral weight and rotated mud line hanger running tool to 1-2 kftlbs. POOH with torque tool.

Ran in hole with 9 5/8" inline spear, latched spear several times into mud line hanger running tool, not able to release mud line hanger running tool. POOH with 9 5/8" inline spear.

Removed locating dogs on torque tool, ran in hole with same and latched into mud line hanger running tool. Rotated slowly clockwise (1-6 kftlbs), POOH with torque tool.

Ran in hole with 9 5/8" inline spear and attempted to fish, POOH, no fish. Ran back with same, latched fish with 6 tons over pull, rotated 3 times clockwise (20 kftlbs) then lost over pull weight. POOH and retrieved mud line hanger running tool.

Sat 13 3/8" x 9 5/8" TA cap at 137.7 m, pressure tested same to 210 bar/10 min, ok.

Nippled down diverter assembly, slick joint and BOP.

Laid down wellhead.

Ran in hole with 13 3/8" surface hanger running tool, latched same into 13 3/8" surface hanger. Released 13 3/8" surface hanger (14 turns clockwise, 8-11 kftlbs, 7 tons over pull). POOH with 13 3/8" surface hanger running tool. Pulled and laid down 13 3/8" casing from 137 m.

Ran in hole and sat 13 3/8" Full bore TA cap at 137.1 m

Ran in hole with 30" spear, attached same into 30" conductor, released Lynx connector (by pressuring up control line) and pulled 30" conductor to rig floor. Released 30" spear and pulled 30" conductor.

Cleared Texas deck, raised and secured same.

Installed trawl protector on top of 30" conductor (verified all 6 legs released).

Ran in hole and stabbed transponder into top of trawl protector, measured distance from transponder on top of trawl protector to transponders on 12/15-12 trawl protector. POOH with transponder.

10.12 Rig move

Total time used: 203.0 hrs.

Operational time: 40.0 hrs.

Downtime: 163.0 hrs

Skidded rig into rig move position and prepared for rig move.

Waited on weather for 163 hrs (6.8 days).

Jacked rig down to 3 m draft and checked the hull for water integrity.

Connected tow boat "Mærsk Attender" to the main forward towing bridle and tow boat "Normand Titan" to the secondary towing bridle.

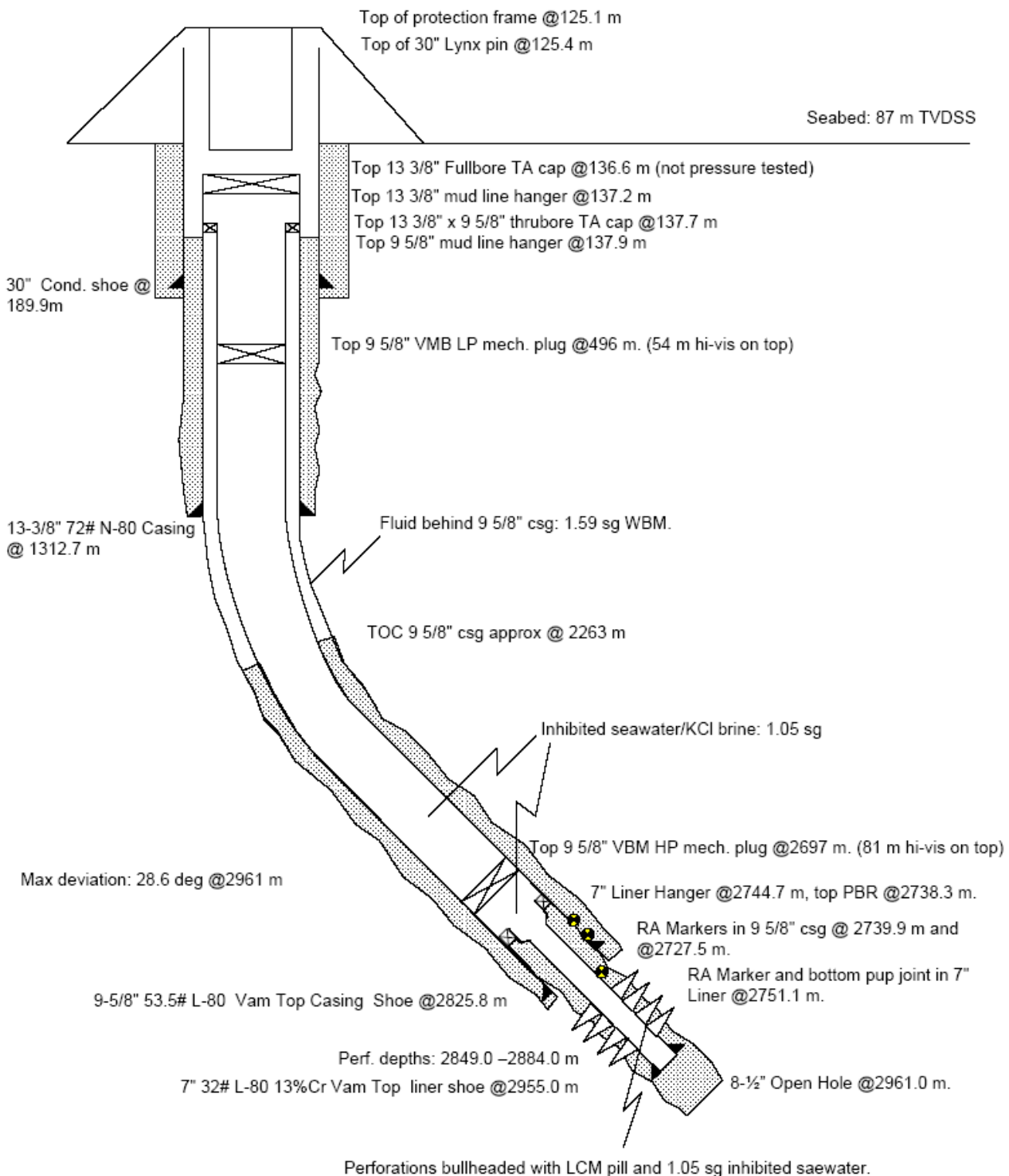
Jacked rig down to main sailing draft at 4.8 m. Raised legs off bottom. Moved rig to outside the 15/12-16 S 500 m radius zone.

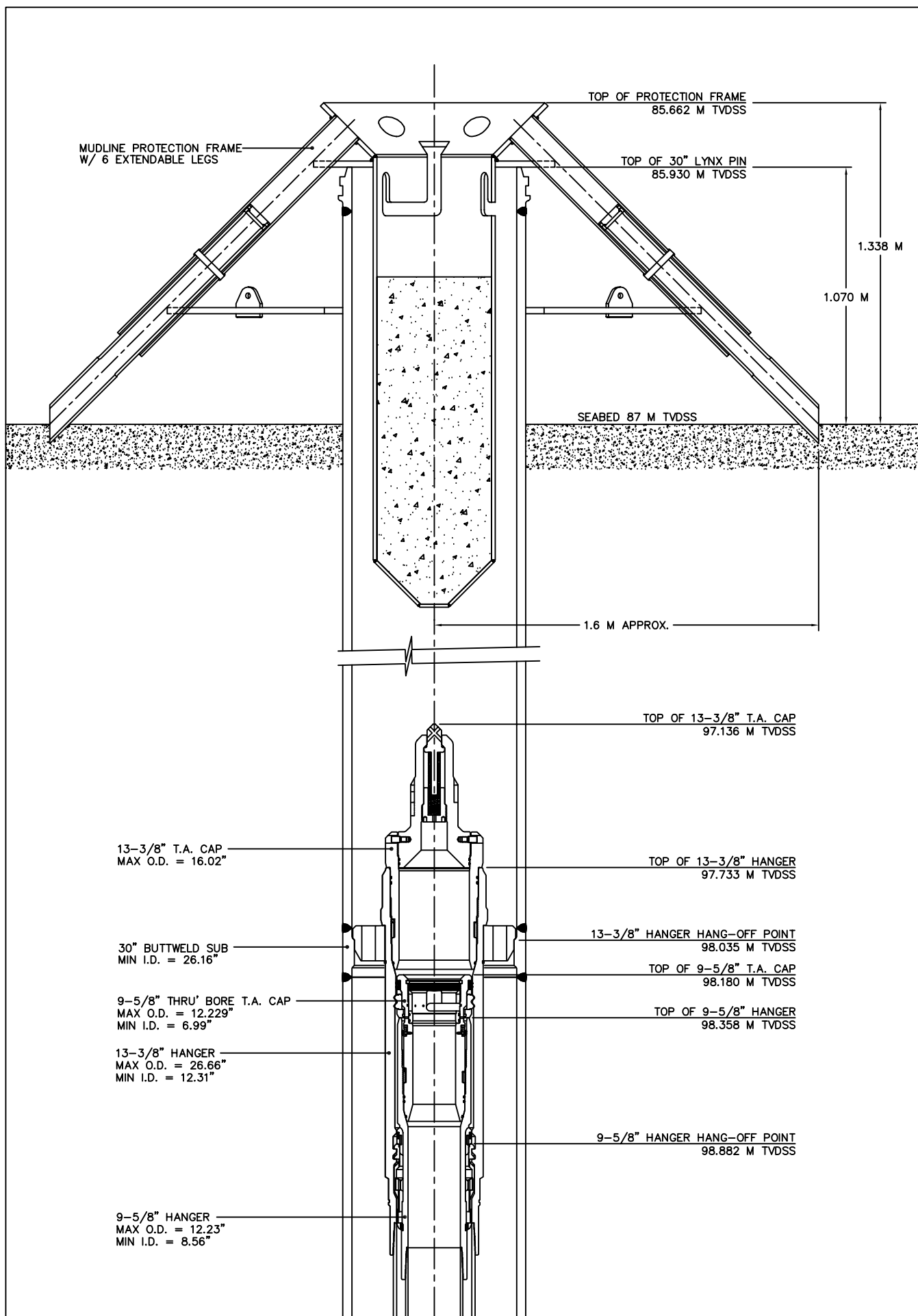
11.0 Well Construction Summaries

11.1 Final Well Schematic

11.1.1 Final Well Status/WELL SKETCH Temporary P & A 15/12-16 S

Rig: Maersk Giant
 RKB-MSL: 39.5 m
 RKB-seabed: 126.5 m
 All depths in MD RKB





TALISMAN NORWAY
VARG SOUTH WELL 15/12-16S

★ Plexus Ocean Systems Ltd.

TRT-S MUDLINE SUSPENSION SYSTEM
30" (1-1/2") X 13-3/8" X 9-5/8"
TEMPORARY ABANDONMENT STACK-UP
W/ MUDLINE PROTECTION FRAME INSTALLED

DRAWN	JDM	03/05/06
APPRV	TPD	03/05/06
REV	A1	EST WT
DRAWING NO. EL00946		

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11.2 Casing and Tubing Reports

Casing and Liner Data

Size	Shoe [m] TVD RKB	Shoe [m] MD RKB	Top [m] TVD RKB	Top [m] MD RKB	Weight [lbs/ft]	Grade	Connection	Collapse rating [bar]	Burst rating [bar]	Tension minimum yield [tons]
30": 137.7-186.7 m 15.0- 137.7 m	186.7	186.7	137.7 15.0	137.7 15.0	456.57 309.72	X-52 X-52	SL-60 SL-60	269 112	322 215	1483 1483
13 3/8"	1303.8	1312.7	137.5	137.5	72	L-80	Buttress	184	371	739
9 5/8"	2777.8	2825.8	138.3	138.3	53.5	L-80	Vam Top	456	547	553
7"	2891.7	2955.0	2708.7	2748.3	32	L-80	Vam Top HT	593	625	332

15/12-16S	30" Conductor tally	As Run
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Shoe depth	186.89	m
Section TD (36")	189.00	m
Optimum Make up torque:	30,000	ftlb
OD	30.00	Inch
ID 30"	27.00	"
ID BWS	26.16	"
Weight	686.00	kg/m
Grade		
Connection	H60D/MT, H90D/MT	

Run nr:	S/N	Length (m)	Btm jnt. when RIH	Top jnt. when RIH	Depth btm. of Jt. (m)	Depth top of jt. (m)	Remarks
1	AW	12.290	12.290	0.000	186.89	174.60	20" shoe joint with 30" XO
2	AW 74886-03	12.280	24.570	12.290	174.60	162.32	H60D/MT
3	AW 74886-01	12.290	36.860	24.570	162.32	150.03	H60D/MT
4	AW 74886-04	12.295	49.155	36.860	150.03	137.74	H60D/MT
5	8895-2	12.195	61.350	49.155	137.74	125.54	BWS
6	8894-2	12.480	73.830	61.350	125.54	113.06	Lynx connector
7	AW 73396-01	12.290	86.120	73.830	113.06	100.77	
8	AW 73396-02	12.300	98.420	86.120	100.77	88.47	
9	AW 73396-03	12.290	110.710	98.420	88.47	76.18	
10	AW 73396-04	12.290	123.000	110.710	76.18	63.89	
11	AW 73396-09	12.270	135.270	123.000	63.89	51.62	
12	AW 73396-11	12.300	147.570	135.270	51.62	39.32	
13	AW 73396-12	12.305	159.875	147.570	39.32	27.02	
14	AW 02533-01	12.290	172.165	159.875	27.02	14.73	Tension Joint
15	DK 11302-023	3.050	175.215	172.165	14.73	11.68	Pup
16	AW 73396-14	12.300	187.515	175.215	11.68	(0.63)	

Seabed (m RKB MG):	126.50
Splash zone (m RKB MG):	39.50
Texas deck (m RKB MG):	19.60
Cut joint AW 02533-01 at: 3.305 m above bottom of tension ring (m RKB MG)	15.045
Lynx connector above seabed in inches (42" +/- 10")	

LEFT OVER JOINTS:

Joint #	Length					Remarks
AW74886-06	12.280					30" x 1" Intermediate joint
AW73396-13	12.295					30" x 1/12" Intermediate joint
AW73396-15	12.295					30" x 1/12" Intermediate joint
AW080430-08	12.290					30" x 1/12" Intermediate joint
AW 73396-10						30" x 1/12" Intermediate joint
BU Tension jt	12.280					S/N: 02533-02
BU BWS jt	12.245					
AW74887-01	12.350					30" x 1/12" Shoe Joint
8894-1	12.460					Lynx conncetor

WELL: 15/12-16S CSG. SIZE: 13 3/8" GRADE: 72 #, N80, Buttress				As Run Utarbeidet av: Sjekket av :	Date: E. Tveit T. Veiberg	29/06/2006 09:00
Run no	Joint no	Joint length (m)	Total length (m)	Depth btm.item (mMD)	Depth top.item (mMD)	Comments
				17 1/2" hole to:		1319.00
					1312.70	13 3/8" shoe depth
1	Shoe	13.221	13.22	1312.697	1299.476	Centralizer
2	Intermediate I	12.625	25.85	1299.476	1286.851	Centralizer. Tubelock Pin.
3	Pup below FC	4.000	29.85	1286.851	1282.851	Centralizer. Tubelock Pin.
	Float Collar	0.626	30.47	1282.851	1282.225	
	Pup above FC	6.030	36.50	1282.225	1276.195	
4	100	11.301	47.80	1276.195	1264.894	Centralizer. Tubelock Pin.
5	99	12.528	60.33	1264.894	1252.366	Centralizer
6	98	12.810	73.14	1252.366	1239.556	Centralizer
7	97	11.856	85.00	1239.556	1227.700	Centralizer
8	96	11.332	96.33	1227.700	1216.368	Centralizer
9	95	11.648	107.98	1216.368	1204.720	Centralizer
10	94	12.521	120.50	1204.720	1192.199	Centralizer
11	93	11.661	132.16	1192.199	1180.538	Centralizer
12	92	12.669	144.83	1180.538	1167.869	Centralizer
13	91	12.605	157.43	1167.869	1155.264	Centralizer
14	90	12.499	169.93	1155.264	1142.765	Centralizer
15	89	12.560	182.49	1142.765	1130.205	Centralizer
16	88	12.145	194.64	1130.205	1118.060	Centralizer
17	87	11.796	206.43	1118.060	1106.264	Centralizer
18	86	11.696	218.13	1106.264	1094.568	Centralizer
19	85	11.655	229.78	1094.568	1082.913	Centralizer
20	84	11.374	241.16	1082.913	1071.539	Centralizer
21	83	11.475	252.63	1071.539	1060.064	Centralizer
22	82	12.026	264.66	1060.064	1048.038	Centralizer
23	81	11.879	276.54	1048.038	1036.159	Centralizer
24	80	12.422	288.96	1036.159	1023.737	Centralizer
25	79	12.310	301.27	1023.737	1011.427	Centralizer
26	78	12.489	313.76	1011.427	998.938	Centralizer
27	77	12.672	326.43	998.938	986.266	Centralizer
28	76	11.553	337.98	986.266	974.713	Centralizer
29	75	12.788	350.77	974.713	961.925	Centralizer
30	74	12.026	362.80	961.925	949.899	Centralizer
31	73	11.967	374.77	949.899	937.932	Centralizer
32	72	12.420	387.19	937.932	925.512	Centralizer
33	71	12.000	399.19	925.512	913.512	Centralizer
34	70	12.6	411.79	913.512	900.912	Centralizer

Run no	Joint no	Joint length (m)	Total length (m)	Depth btm.item (mMD)	Depth top.item (mMD)	Comments
35	69	12.580	424.37	900.912	888.332	Centralizer
36	68	12.711	437.08	888.332	875.621	Centralizer
37	67	12.709	449.79	875.621	862.912	Centralizer
38	66	12.214	462.00	862.912	850.698	Centralizer
39	65	12.769	474.77	850.698	837.929	Centralizer
40	64	11.676	486.44	837.929	826.253	Centralizer
41	63	12.938	499.38	826.253	813.315	Centralizer
42	62	12.537	511.92	813.315	800.778	Centralizer
43	61	12.531	524.45	800.778	788.247	Centralizer
44	60	12.676	537.13	788.247	775.571	Centralizer
45	59	12.493	549.62	775.571	763.078	Centralizer
46	58	12.670	562.29	763.078	750.408	Centralizer
47	57	12.031	574.32	750.408	738.377	Centralizer
48	56	11.868	586.19	738.377	726.509	Centralizer
49	55	11.750	597.94	726.509	714.759	Centralizer
50	54	12.702	610.64	714.759	702.057	Centralizer
51	53	12.794	623.43	702.057	689.263	Centralizer
52	52	12.441	635.88	689.263	676.822	Centralizer
53	51	12.827	648.70	676.822	663.995	Centralizer
54	50	11.343	660.05	663.995	652.652	Centralizer
55	49	12.484	672.53	652.652	640.168	Centralizer
56	48	12.302	684.83	640.168	627.866	Centralizer
57	47	12.337	697.17	627.866	615.529	Centralizer
58	46	11.215	708.38	615.529	604.314	Centralizer
59	45	12.466	720.85	604.314	591.848	Centralizer
60	44	12.743	733.59	591.848	579.105	Centralizer
61	43	12.695	746.29	579.105	566.410	Centralizer
62	42	12.525	758.81	566.410	553.885	Centralizer
63	41	12.347	771.16	553.885	541.538	Centralizer
64	40	12.628	783.79	541.538	528.910	Centralizer
65	39	12.025	795.81	528.910	516.885	Centralizer
66	38	12.728	808.54	516.885	504.157	Centralizer
67	37	11.446	819.99	504.157	492.711	Centralizer
68	36	11.817	831.80	492.711	480.894	Centralizer
69	35	12.517	844.32	480.894	468.377	Centralizer
70	34	11.358	855.68	468.377	457.019	Centralizer
71	33	11.979	867.66	457.019	445.040	Centralizer
72	32	12.579	880.24	445.040	432.461	Centralizer
73	31	11.831	892.07	432.461	420.630	Centralizer
74	30	11.332	903.40	420.630	409.298	Centralizer
75	29	12.786	916.19	409.298	396.512	Centralizer

Run no	Joint no	Joint length (m)	Total length (m)	Depth btm.item (mMD)	Depth top.item (mMD)	Comments
76	28	11.391	927.58	396.512	385.121	Centralizer
77	27	12.722	940.30	385.121	372.399	Centralizer
78	26	12.340	952.64	372.399	360.059	Centralizer
79	25	11.292	963.93	360.059	348.767	Centralizer
80	24	12.627	976.56	348.767	336.140	Centralizer
81	23	11.067	987.62	336.140	325.073	Centralizer
82	22	12.324	999.95	325.073	312.749	Centralizer
83	21	12.044	1011.99	312.749	300.705	Centralizer
84	20	12.484	1024.48	300.705	288.221	Centralizer
85	19	12.536	1037.01	288.221	275.685	Centralizer
86	18	11.784	1048.80	275.685	263.901	Centralizer
87	17	12.323	1061.12	263.901	251.578	Centralizer
88	16	11.605	1072.72	251.578	239.973	Centralizer
89	15	12.471	1085.20	239.973	227.502	Centralizer
90	14	11.331	1096.53	227.502	216.171	Centralizer
91	13	11.458	1107.98	216.171	204.713	Centralizer
92	12	11.693	1119.68	204.713	193.020	
93	11	12.617	1132.29	193.020	180.403	
94	10	12.383	1144.68	180.403	168.020	
95	9	12.366	1157.04	168.020	155.654	
96	8	11.354	1168.40	155.654	144.300	
97	Below MLHP	6.815	1175.21	144.300	137.485	HOP @ MLH
	Above MLHP	6.323	1181.54	137.485	131.162	
98	10	7.954	1189.49	131.162	123.208	
99	9	12.243	1201.73	123.208	110.965	
100	8	13.077	1214.81	110.965	97.888	
101	7	13.608	1228.42	97.888	84.280	
102	6	13.016	1241.43	84.280	71.264	
103	5	11.521	1252.95	71.264	59.743	
104	4	12.885	1265.84	59.743	46.858	
105	PX12	12.991	1278.83	46.858	33.867	
106	PX4	13.259	1292.09	33.867	20.608	
107	WH below HOP	5.503	1297.59	20.608	15.105	HOP = 15.045 m RKB.
	WH above HOP	6.676	1304.27	15.105	8.429	13 3/8" Casing hanger landing point prior to adjust.
108	Landing joint A	6.054	1310.32	8.429	2.375	
	Landing joint B	3.023	1313.35	2.375	-0.648	

Run no	Joint no	Joint length (m)	Total length (m)	Depth btm.item (mMD)	Depth top.item (mMD)	Comments
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GENERAL DATA			Make up torque (kft-lbs)		
Size:	13 3/8"		Buttress		
Grade :	N80		Min		
Thread :	Buttress		Opt		
Weight :	72 lb/ft		Max		
Capacity 13 3/8" casing (l/m):	78.10				
Pump capacity 96% eff. (l/stk):	16.01				
TD of 17 1/2" hole (m):	1319.00				
30" conductor shoe (m):	187.00				
Capacity 17 1/2" hole (l/m):	155.20				
Capacity 30" conductor (l/m):	369.40				
Mud density in hole (sg):	1.20				

Casing inventory when picking up MLS hanger				
ITEM	On Board	In the Hole	Left on Deck	
13 3/8" csg	100	93	7	
13 3/8" pup jt	2	0	2	After Casing Head
Shoe joint	1	1	0	
Float joint	1	1	0	
Landing string jnt	16	0	16	After MLS hanger
Wellhead joint	2	0	2	After MLS hanger
Mud line Hanger	2	1	1	
Intermediate jt	3	1	2	
Total	127	97	30	

Casing Inventory when picking up Casing Head				
ITEM	On Board	In the Hole	Left on Deck	
13 3/8" csg	100	93	7	
13 3/8" pup jt	2	0	2	After Casing Head
Shoe joint	1	1	0	
Float joint	1	1	0	
Landing string jnt	16	9	7	
Wellhead joint	2	1	1	
Mud line Hanger	2	1	1	
Intermediate jt	3	1	2	
Total	127	107	20	

Run no	Joint no.	Joint length (m)	Total length (m)	Depth btm.item (mMD)	Depth top.item (mMD)	Comments
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Left overs:

Standard Joints	Length
7	11.904
6	10.669
5	12.820
4	12.384
3	12.883
2	12.129
1	12.557
Int II	12.661
Int III	12.850

Space-out joints	Length
2	13.372
2	13.272
6	11.559
11	12.8
3	12.974
13	12.866
SP2	7.954
Mudline Hanger	????
Casing Head	????

WELL: 15/12-16S CSG. SIZE: 9 5/8" GRADE: 53,5 #, L-80, Vam Top				Rev 02 Utarbeidet av: Sjekket av :	Date: O. J. Bratland G. Smaaskjær	29/06/2006 09:02
Run no	Joint no	Joint length (m)	Total length (m)	Depth btm.item (mMD)	Depth top.item (mMD)	Comments
				12 1/4" hole to:		2835.26
				Rat hole:		9.50
				9 5/8" Shoe:		2,825.76
1	Shoe	13.073	13.07	2825.756	2812.683	Centralizer
2	Intermediate I	12.457	25.53	2812.683	2800.226	Centralizer. Tubelock Pin.
3	Intermediate 2	12.382	37.91	2800.226	2787.844	Centralizer. Tubelock Pin.
5	Pup below FC	4.080	41.99	2787.844	2783.764	Centralizer. Tubelock Pin.
	Float Collar	0.615	42.61	2783.764	2783.149	
	Pup above FC	6.115	48.72	2783.149	2777.034	
6	250	12.506	61.23	2777.034	2764.528	Centralizer
7	249	12.350	73.58	2764.528	2752.178	Centralizer
8	248	12.249	85.83	2752.178	2739.929	rad mark.@ 2739,9 m
9	247	12.442	98.27	2739.929	2727.487	rad mark.@ 2727,5 m
10	246	12.698	110.97	2727.487	2714.789	Centralizer
11	245	12.400	123.37	2714.789	2702.389	Centralizer
12	244	12.437	135.80	2702.389	2689.952	Centralizer
13	243	12.635	148.44	2689.952	2677.317	Centralizer
14	242	12.312	160.75	2677.317	2665.005	Centralizer
15	241	12.607	173.36	2665.005	2652.398	Centralizer
16	240	12.481	185.84	2652.398	2639.917	Centralizer
17	239	12.361	198.20	2639.917	2627.556	Centralizer
18	238	12.315	210.52	2627.556	2615.241	Centralizer
19	237	12.565	223.08	2615.241	2602.676	Centralizer
20	236	12.215	235.30	2602.676	2590.461	Centralizer
21	235	12.501	247.80	2590.461	2577.960	Centralizer
22	234	12.107	259.90	2577.960	2565.853	Centralizer
23	233	12.605	272.51	2565.853	2553.248	Centralizer
24	232	12.579	285.09	2553.248	2540.669	Centralizer
25	231	12.615	297.70	2540.669	2528.054	Centralizer
26	230	12.319	310.02	2528.054	2515.735	Centralizer
27	229	12.180	322.20	2515.735	2503.555	Centralizer
28	228	12.379	334.58	2503.555	2491.176	Centralizer
29	227	11.118	345.70	2491.176	2480.058	Centralizer
30	226	12.508	358.21	2480.058	2467.550	Centralizer
31	225	12.512	370.72	2467.550	2455.038	Centralizer
32	224	12.472	383.19	2455.038	2442.566	Centralizer
33	223	12.050	395.24	2442.566	2430.516	Centralizer
34	222	12.248	407.49	2430.516	2418.268	Centralizer

Run no	Joint no	Joint length (m)	Total length (m)	Depth btm.item (mMD)	Depth top.item (mMD)	Comments
35	221	12.478	419.97	2418.268	2405.790	Centralizer
36	220	12.510	432.48	2405.790	2393.280	Centralizer
37	219	12.417	444.89	2393.280	2380.863	Centralizer
38	218	12.379	457.27	2380.863	2368.484	Centralizer
39	217	12.396	469.67	2368.484	2356.088	Centralizer
40	216	12.290	481.96	2356.088	2343.798	Centralizer
41	215	12.312	494.27	2343.798	2331.486	Centralizer
42	214	12.303	506.57	2331.486	2319.183	Centralizer
43	213	12.545	519.12	2319.183	2306.638	Centralizer
44	212	12.659	531.78	2306.638	2293.979	Centralizer
45	211	12.230	544.01	2293.979	2281.749	Centralizer
46	210	12.364	556.37	2281.749	2269.385	Centralizer
47	209	11.806	568.18	2269.385	2257.579	Centralizer
48	208	12.321	580.50	2257.579	2245.258	Centralizer
49	207	12.577	593.08	2245.258	2232.681	Centralizer
50	206	12.426	605.50	2232.681	2220.255	Centralizer
51	205	12.325	617.83	2220.255	2207.930	Centralizer
52	204	12.862	630.69	2207.930	2195.068	
53	203	10.967	641.66	2195.068	2184.101	
54	202	12.630	654.29	2184.101	2171.471	
55	201	12.247	666.53	2171.471	2159.224	
56	200	12.526	679.06	2159.224	2146.698	
57	199	12.384	691.44	2146.698	2134.314	
58	198	12.407	703.85	2134.314	2121.907	
59	197	12.291	716.14	2121.907	2109.616	
60	196	11.454	727.59	2109.616	2098.162	
61	195	12.357	739.95	2098.162	2085.805	
62	194	12.324	752.28	2085.805	2073.481	
63	193	12.435	764.71	2073.481	2061.046	
64	192	12.078	776.79	2061.046	2048.968	
65	191	12.478	789.27	2048.968	2036.490	
66	190	12.319	801.59	2036.490	2024.171	
67	189	12.415	814.00	2024.171	2011.756	
68	188	12.406	826.41	2011.756	1999.350	
69	187	12.394	838.80	1999.350	1986.956	
70	186	12.068	850.87	1986.956	1974.888	
71	185	12.234	863.10	1974.888	1962.654	
72	184	12.412	875.51	1962.654	1950.242	
73	183	12.076	887.59	1950.242	1938.166	
74	182	12.424	900.01	1938.166	1925.742	
75	181	12.483	912.50	1925.742	1913.259	

Run no	Joint no	Joint length (m)	Total length (m)	Depth btm.item (mMD)	Depth top.item (mMD)	Comments
76	180	12.554	925.05	1913.259	1900.705	
77	179	12.412	937.46	1900.705	1888.293	
78	178	12.362	949.83	1888.293	1875.931	
79	177	11.065	960.89	1875.931	1864.866	
80	176	12.040	972.93	1864.866	1852.826	
81	175	12.022	984.95	1852.826	1840.804	
82	174	12.577	997.53	1840.804	1828.227	
83	173	12.159	1009.69	1828.227	1816.068	
84	172	12.529	1022.22	1816.068	1803.539	
85	171	12.377	1034.59	1803.539	1791.162	
86	170	12.558	1047.15	1791.162	1778.604	
87	169	12.329	1059.48	1778.604	1766.275	
88	168	12.261	1071.74	1766.275	1754.014	
89	167	12.331	1084.07	1754.014	1741.683	
90	166	12.415	1096.49	1741.683	1729.268	
91	165	12.418	1108.91	1729.268	1716.850	
92	164	12.638	1121.54	1716.850	1704.212	
93	163	11.856	1133.40	1704.212	1692.356	
94	162	12.628	1146.03	1692.356	1679.728	
95	161	12.174	1158.20	1679.728	1667.554	
96	160	12.417	1170.62	1667.554	1655.137	
97	159	12.359	1182.98	1655.137	1642.778	
98	158	12.503	1195.48	1642.778	1630.275	
99	157	12.467	1207.95	1630.275	1617.808	
100	156	12.221	1220.17	1617.808	1605.587	
101	155	12.511	1232.68	1605.587	1593.076	
102	154	12.558	1245.24	1593.076	1580.518	
103	153	12.392	1257.63	1580.518	1568.126	
104	152	12.417	1270.05	1568.126	1555.709	
105	151	12.584	1282.63	1555.709	1543.125	
106	150	12.450	1295.08	1543.125	1530.675	
107	149	12.327	1307.41	1530.675	1518.348	
108	148	12.716	1320.12	1518.348	1505.632	
109	147	12.315	1332.44	1505.632	1493.317	
110	146	12.149	1344.59	1493.317	1481.168	
111	145	12.401	1356.99	1481.168	1468.767	
112	144	12.095	1369.08	1468.767	1456.672	
113	143	12.433	1381.52	1456.672	1444.239	
114	142	12.387	1393.90	1444.239	1431.852	
115	141	12.282	1406.19	1431.852	1419.570	
116	140	12.447	1418.63	1419.570	1407.123	

Run no	Joint no	Joint length (m)	Total length (m)	Depth btm.item (mMD)	Depth top.item (mMD)	Comments
117	139	12.382	1431.02	1407.123	1394.741	
118	138	12.335	1443.35	1394.741	1382.406	
119	137	12.253	1455.60	1382.406	1370.153	
120	136	12.389	1467.99	1370.153	1357.764	
121	135	12.130	1480.12	1357.764	1345.634	
122	134	12.448	1492.57	1345.634	1333.186	
123	133	12.204	1504.77	1333.186	1320.982	
124	132	12.516	1517.29	1320.982	1308.466	
125	131	12.340	1529.63	1308.466	1296.126	
126	130	12.460	1542.09	1296.126	1283.666	
127	129	12.519	1554.61	1283.666	1271.147	
128	128	12.842	1567.45	1271.147	1258.305	
129	127	12.287	1579.74	1258.305	1246.018	
130	126	12.584	1592.32	1246.018	1233.434	
131	125	12.494	1604.82	1233.434	1220.940	
132	124	12.398	1617.21	1220.940	1208.542	
133	123	12.333	1629.55	1208.542	1196.209	
134	122	11.964	1641.51	1196.209	1184.245	
135	121	12.341	1653.85	1184.245	1171.904	
136	120	12.615	1666.47	1171.904	1159.289	
137	119	12.541	1679.01	1159.289	1146.748	
138	118	12.375	1691.38	1146.748	1134.373	
139	117	12.407	1703.79	1134.373	1121.966	
140	116	12.420	1716.21	1121.966	1109.546	
141	115	12.469	1728.68	1109.546	1097.077	
142	114	12.012	1740.69	1097.077	1085.065	
143	113	12.284	1752.98	1085.065	1072.781	
144	112	12.385	1765.36	1072.781	1060.396	
145	111	12.258	1777.62	1060.396	1048.138	
146	110	12.469	1790.09	1048.138	1035.669	
147	109	12.290	1802.38	1035.669	1023.379	
148	108	12.767	1815.14	1023.379	1010.612	
149	107	12.400	1827.54	1010.612	998.212	
150	106	12.520	1840.06	998.212	985.692	
151	105	12.400	1852.46	985.692	973.292	
152	104	12.075	1864.54	973.292	961.217	
153	103	12.253	1876.79	961.217	948.964	
154	102	12.739	1889.53	948.964	936.225	
155	101	12.335	1901.87	936.225	923.890	
156	100	12.489	1914.36	923.890	911.401	
157	99	12.236	1926.59	911.401	899.165	

Run no	Joint no	Joint length (m)	Total length (m)	Depth btm.item (mMD)	Depth top.item (mMD)	Comments
158	98	12.227	1938.82	899.165	886.938	
159	97	12.507	1951.33	886.938	874.431	
160	96	12.500	1963.83	874.431	861.931	
161	95	12.715	1976.54	861.931	849.216	
162	94	12.394	1988.93	849.216	836.822	
163	93	12.235	2001.17	836.822	824.587	
164	92	12.532	2013.70	824.587	812.055	
165	91	12.409	2026.11	812.055	799.646	
166	90	12.489	2038.60	799.646	787.157	
167	89	12.386	2050.99	787.157	774.771	
168	88	12.368	2063.35	774.771	762.403	
169	87	11.928	2075.28	762.403	750.475	
170	86	12.383	2087.66	750.475	738.092	
171	85	12.383	2100.05	738.092	725.709	
172	84	12.378	2112.43	725.709	713.331	
173	83	12.584	2125.01	713.331	700.747	
174	82	12.392	2137.40	700.747	688.355	
175	81	12.370	2149.77	688.355	675.985	
176	80	12.264	2162.04	675.985	663.721	
177	79	12.365	2174.40	663.721	651.356	
178	78	12.493	2186.89	651.356	638.863	
179	77	12.407	2199.30	638.863	626.456	
180	76	12.450	2211.75	626.456	614.006	
181	75	12.395	2224.15	614.006	601.611	
182	74	12.396	2236.54	601.611	589.215	
183	73	12.336	2248.88	589.215	576.879	
184	72	12.029	2260.91	576.879	564.850	
185	71	12.387	2273.29	564.850	552.463	
186	70	12.483	2285.78	552.463	539.980	
187	69	12.176	2297.95	539.980	527.804	
188	68	12.352	2310.30	527.804	515.452	
189	67	12.479	2322.78	515.452	502.973	
190	66	12.480	2335.26	502.973	490.493	
191	65	12.424	2347.69	490.493	478.069	
192	64	12.145	2359.83	478.069	465.924	
193	63	12.546	2372.38	465.924	453.378	
194	62	12.310	2384.69	453.378	441.068	
195	61	12.726	2397.41	441.068	428.342	
196	60	12.500	2409.91	428.342	415.842	
197	59	12.485	2422.40	415.842	403.357	
198	58	12.017	2434.42	403.357	391.340	

Run no	Joint no	Joint length (m)	Total length (m)	Depth btm.item (mMD)	Depth top.item (mMD)	Comments
199	57	12.082	2446.50	391.340	379.258	
200	56	12.399	2458.90	379.258	366.859	
201	55	12.023	2470.92	366.859	354.836	
202	54	12.524	2483.44	354.836	342.312	
203	53	12.330	2495.77	342.312	329.982	
204	52	12.162	2507.94	329.982	317.820	
205	51	12.335	2520.27	317.820	305.485	
206	50	12.505	2532.78	305.485	292.980	
207	49	12.462	2545.24	292.980	280.518	
208	48	12.358	2557.60	280.518	268.160	
209	47	12.259	2569.86	268.160	255.901	
210	46	11.833	2581.69	255.901	244.068	
211	45	12.335	2594.02	244.068	231.733	
212	44	12.535	2606.56	231.733	219.198	
213	43	12.530	2619.09	219.198	206.668	
214	42	12.300	2631.39	206.668	194.368	
215	41	12.477	2643.87	194.368	181.891	
216	40	12.691	2656.56	181.891	169.200	
217	39	12.415	2668.97	169.200	156.785	
218	38	12.383	2681.35	156.785	144.402	
219	Below MLHP	6.065	2687.42	144.402	138.337	HOP @ MLH
	Above MLHP	6.305	2693.72	138.337	132.032	Fixed piont !
220	Pup jt A	1.476	2695.20	132.032	130.556	
221	PX 13	12.210	2707.41	130.556	118.346	
222	PX 7	12.094	2719.50	118.346	106.252	
223	PX 10	12.180	2731.68	106.252	94.072	
224	PX 11	12.129	2743.81	94.072	81.943	
225	PX 12	12.276	2756.09	81.943	69.667	
226	PX 4	12.146	2768.24	69.667	57.521	
227	PX 1	12.298	2780.53	57.521	45.223	
228	PX 14	12.218	2792.75	45.223	33.005	
229	PX 16	12.512	2805.26	33.005	20.493	
230	Surface hanger	12.442	2817.71	20.493	8.051	Surface HOP @ 14,685 m
231	Land Pup C	9.581	2827.29	8.051	-1.530	

Run no	Joint no	Joint length (m)	Total length (m)	Depth btm.item (mMD)	Depth top.item (mMD)	Comments
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GENERAL DATA			Make up torque (ft-lbs)		
Size:		9 5/8"		Vam Top	
Grade :		L-80	Min	20850	
Thread :		Vam Top	Opt	23150	
Weight :		53,3 lb/ft	Max	25450	
Capacity 9 5/8" casing (l/m):		36.91	(Green book)		
Pump capacity 97% eff. (l/stk):		16.18			
TD of 12 1/4" hole (m):					
13 3/8" casing shoe (m):		1312.70			
Capacity 12 1/4" hole (l/m):		76.04			
Capacity 13 3/8" casing (l/m):		77.25	(Green book)		
Mud density in hole (sg):		1.59			

Casing inventory when picking up surface hanger				
ITEM	On Board	In the Hole	Left on Deck	
9 5/8" csg	231	213	18	
9 5/8" pup jt	6	2	4	After Casing Head
Shoe joint	1	1	0	
Float joint	1	1	0	
Landing string jnt	16	9	7	After MLS hanger
Wellhead joint	2	1	1	After MLS hanger
Mud line Hanger	2	1	1	
Intermediate jt	3	2	1	
Total	262	230	32	

ITEM	On Board	In the Hole	Left on Deck
9 5/8" csg			0
9 5/8" pup jt			0
Shoe joint			0
Float joint			0
Landing string jnt			0
Wellhead joint			0
Mud line Hanger			0
Intermediate jt			0
Total	0	0	0

Left overs:

Run no	Joint no	Joint length (m)	Total length (m)	Depth btm.item (mMD)	Depth top.item (mMD)	Comments
	Standard Joints	Length		Space-out joints		Length
	Intermediate 3	12.464		Pup A		6.079
	37	12.378				
	36	12.281		Pup B		6.038
	35	12.213				
	34	12.083				
	33	12.466				
	32	12.422				
	31	12.415				
	30	12.031				
	29	12.236				
	28	12.647				
	27	12.132				
	26	12.134				
	25	12.453				
	24	12.314				
	23	12.409				
	22	12.884				
	21	12.447				
	20	12.210				
	PX 2	12.114				
	PX 3	12.218				
	PX 5	12.140				
	PX 6	12.282				
	PX 8	12.302				
	PX 9	12.160				
	PX 15	12.516				
	Pup B	1.476				
	Pup D	11.506				

Use as backup for Plexus!

7" LINER RUNNING LIST

15/12-16 S

Last updated on: 29-Jun-06 G.Smaaskjær

As run

Make up torque Vam Top HT: Min 14050 Opt: 15550 Max 17900 ft/lbs

32 ppf grade L-80

7" Cap l/m = 18.82 & Displ l/m OE = 6.6 CE =24.83 16.18 liters per stroke @ 97%

Run no	Jnt. no	Jnt. length meters	Acc.length incl. item meters	depth bot. item meters	Displm. incl. item cu.meters	Centr. Prog.	Thread Type	Remarks	Depth top.item
1	SHOE A	13.475	13.48	2955.00	0.08	1	Vam Tp HT	Shoetrack to be Bakerlocked	2941.53
2	25	12.234	25.71	2941.53	0.16	1	Vam Tp HT	Fill every second Joint	2929.29
3	Pup below float	2.050	27.76	2929.29	0.17	1	Vam Tp HT		
	Float/land collar	0.605	28.36	2927.24	0.17		Vam Tp HT	Landing collar @ 2927.2	
	Pup above	6.030	34.39	2926.64	0.21		Vam Tp HT		2920.61
4	24	12.243	46.64	2920.61	0.28	1	Vam Tp HT		2908.36
5	23	12.233	58.87	2908.36	0.36	1	Vam Tp HT		2896.13
6	22	12.233	71.10	2896.13	0.43	1	Vam Tp HT		2883.90
7	21	12.238	83.34	2883.90	0.51	1	Vam Tp HT		2871.66
8	20	11.004	94.35	2871.66	0.57	1	Vam Tp HT		2860.66
9	19	12.237	106.58	2860.66	0.65	1	Vam Tp HT		2848.42
10	18	12.244	118.83	2848.42	0.72	1	Vam Tp HT		2836.17
11	17	11.633	130.46	2836.17	0.79	1	Vam Tp HT		2824.54
12	16	12.233	142.69	2824.54	0.86	1	Vam Tp HT		2812.31
13	15	12.224	154.92	2812.31	0.94	1	Vam Tp HT		2800.08
14	14	12.250	167.17	2800.08	1.01	1	Vam Tp HT		2787.83
15	13	12.234	179.40	2787.83	1.09	1	Vam Tp HT		2775.60
16	12	12.238	191.64	2775.60	1.16	1	Vam Tp HT		2763.36
17	11	12.237	203.88	2763.36	1.24	1	Vam Tp HT		2751.13
18	Pup Jnt	4.730	208.61	2751.13	1.26		Vam Tp HT	Inst RA maker 2751.	2746.40
	Hanger	1.675	210.28	2746.40	1.27		Vam Tp HT	Totalt length: 15.11	2744.72
	Frontier Packer	1.440	211.72	2744.72	1.28		Vam Tp HT	Frontier Packer	2743.28
	PBR	4.985	216.71	2743.28	1.31		Vam Tp HT	15 ft Extension above packer	2738.30
	Running tool	2.280	218.99	2738.30	1.33		Vam Tp HT	Running tool (length above PBR)	2736.02
19	XO 4 1/2 IF 5 1/2 FH	0.560	219.545	2736.015					2735.46
20	15 jnt 5 1/2 HWD	139.490	359.04	2735.46					2595.97
21	90 stds 5 1/2" DP	#####	2955.92	2595.97					-0.915
22	5 1/2" PUP	0.000	2955.92	-0.92				Pup 4.49 m	-0.915
23	Cmt Head	10.710	2966.63	-0.92				Btm 2 m can be run in hole	-11.625
								Stick up cmt head	-11.63
								STICK UP 5 1/2" DP	-11.63
					Rad. markers	1		OVERLAP	87.71
	Total	#####			Total central.	17		SHOE AT	2955

7" LINER RUNNING LIST**15/12-16 S**Last updated on: **29-Jun-06** G.Smaaskjær

As run

Make up torque Vam Top HT: Min 14050 Opt: 15550 Max 17900 ft/lbs

32 ppf grade L-80

7" Cap l/m = 18.82 & Displ l/m OE = 6.6 CE =24.83 16.18 liters per stroke @ 97%

Run no	Jnt. no	Jnt. length meters	Acc.length incl. item meters	depth bot. item meters	Displm. incl. item cu.meters	Centr. Prog.	Thread Type	Remarks	Depth top.item
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Note: Cement head racked in derrick on 2 x 5 1/2" DP joints

JOINTS ON DECK WHEN PICKING UP THE HANGER

	Total	In hole	On deck
Hanger w/ running tool	1.000	1	0
Shoe on joint	1.000	1	0
Intermediate	0.000	0	0
Float/LC collar on joint	1.000	1	0
Pup joints	0.000	0	0
7" joint Vam Top HT	25.000	15	10
Total	28.000	18	10

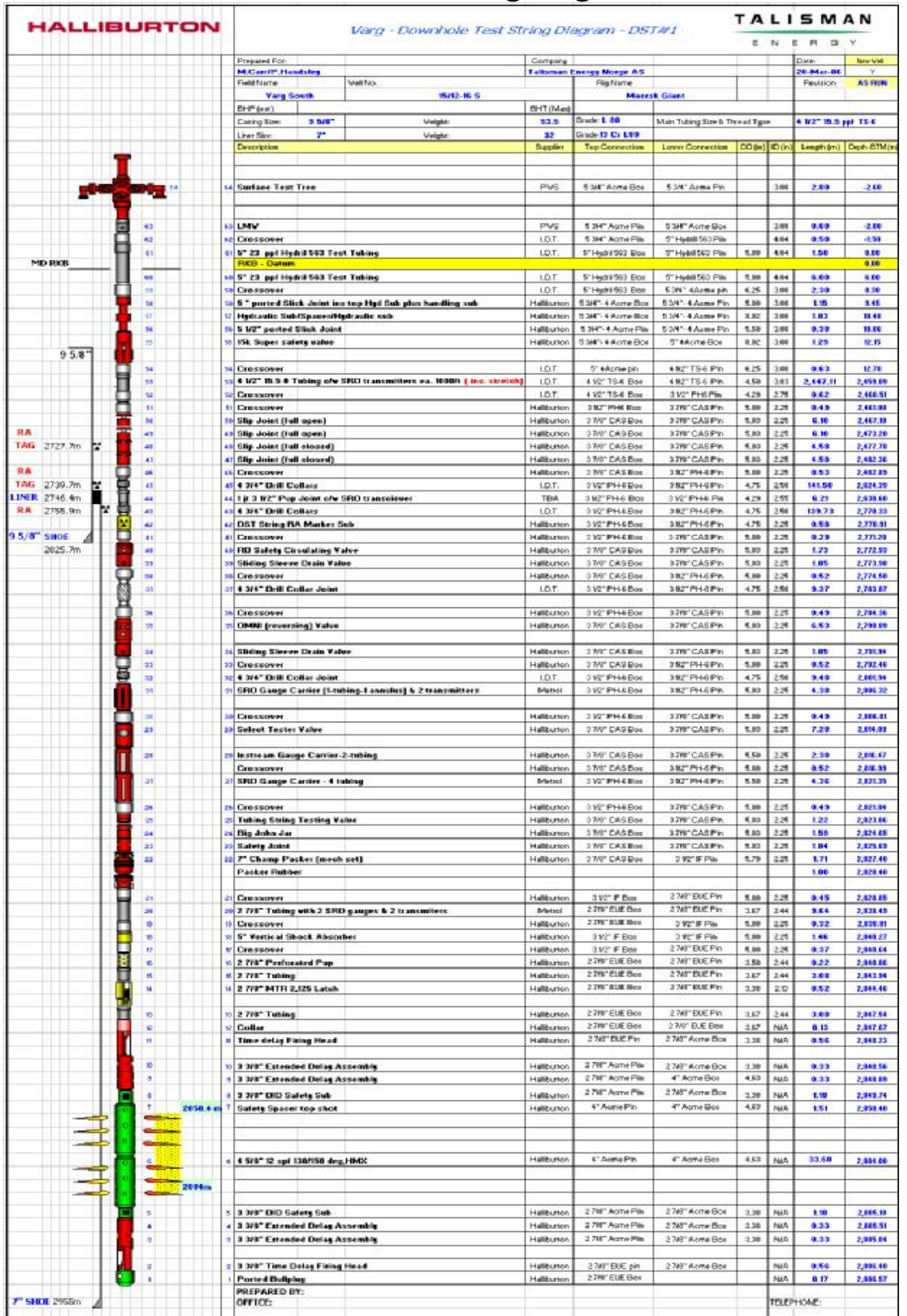
LAID OUT:	length

Spare 7" Vam Top HT

jnt #	jnt length	jnt #	jnt length	jnt #	
10	12.36				
9	12.355				
8	12.364				
7	12.367				
6	12.365				
5	12.355				
4	12.355				
3	12.36				
2	12.365				
1	12.36				

SPARE	length

15/12-16 S Well test string Diagram



11.3 CEMENTING REPORTS

TALISMAN
WELL: 15/12-16S VARG SOUTH
RIG: MÆRSK GIANT

Post Well Report

CEMENTING

DATE: 31.03.2006

Submitted to: Per Haugum, Drilling Engineer – DPT/ Talisman

Prepared by:

Kari Aspøy –Technical Professional

Confidentiality notice:

This report or parts thereof is confidential and must not be forwarded to or made available to third party without the written consent from Halliburton Cementing Norway.

Distribution:

File

Jarl Hovden

Halliburton Norway – Cementing

Tel: 5183 - 8458

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Introduction

This report is based on information obtained from:

- Operation reports filled out by Halliburton offshore operators.
- Daily drilling reports provided by Paladin
- Recommendations and procedures issued by Halliburton field engineer.
- Continuous communication between Paladin/ DPT and other members of the project team.

The objective of this post well report is to capture important issues from the project. For full information on the job operations, a more detailed record of the cementing operations which includes, post operational job report and final job programs sent to the rig for each cementing operation, simulation printouts and charts, are all filed at the Halliburton office in Tananger and can be supplied if required.

Summary

We did 8 cement jobs on well 15/12-16S Varg South. The first job was done 11.02.2006 (30" Conductor) and the 7" liner was cemented 15.13.2006. Due to lost circulation below the 30" conductor shoe, three additional cement plugs was set to cure the losses and a grouting job was performed.

All cement jobs was done successfully.

Health Safety Environment

- No undesired spills or discharges to the sea of chemicals have been reported on this well. Reference is made to mass balance table at the end of the report.
- No serious accidents, personnel injuries or incidents involving the Halliburton offshore staff have been reported.

Service Quality – EJCS Summary

RATING	DESCRIPTION
5	Superior Performance (Establish new quality/performance standards)
4	Exceeded Expectations (Provided more than what was required/expected)
3	Met Expectations (Did what was expected)
2	Below Expectations (Did not do what was expected - *Recovery made)
1	Poor Performance (Job problems/failures occurred - Some *recovery made)

Rating Given by Drilling Supervisor/ Well Site Engineer:

CATEGORY	Cement jobs in chronological order								Average
	30"	LC Plug #1	LC Plug #2	LC Plug #	Grouting	13 3/8"	9 5/8	7"	
Personnel	4	4	4	4	4	3	3	3	3,6
Equipment	4	4	4	4	3	3	2	2	3,3
Job Design	4	4	4	3	3	3	3	3	3,4
Product/ Material	4	4	4	3	3	3	3	3	3,4
Health & Safety	4	4	4	4	4	4	3	4	3,9
Environmental	4	4	4	3	3	3	3	3	3,4
Timeliness	4	4	4	4	4	3	3	3	3,6
Condition / Appearance	4	4	4	3	3	3	3	3	3,4
Communication	4	4	4	4	4	3	3	4	3,8

The average score on EJCS for the cement jobs on Varg South is 3,5.

Comments to score <2:

During the cementing of the 9 5/8" casing the unipro malfunctioned. The problem was solved by changing to manual mixing and an Instrument Technician was sent out the next day to fix the software problem. (Correction Prevention Improvement - CPI no 000300048182)

Due to having problems getting the 7" liner down to setting depth the liner cement job got delayed from approximately 11:00 to 21:30. This delay combined with cold weather caused the cement additive Gascon to gel in the lines from the storage tank to the cement unit causing a blockage. The problem was solved by swapping the Gascon over to another line and went ahead with the job. To prevent this from happening again a CPI has been submitted for an investigation. (Correction Prevention Improvement - CPI no 000300048184)

Operational Summary:

On the following pages there is a description of the cement jobs executed in this drilling operation. Each description will include a summary of events in addition to slurry and spacer recipes. In the table below all the jobs are listed in a chronological order:

Job description	Date
Cement 30" Conductor	11.02.2006
Lost Circ Plug # 1	13.02.2006
Lost Circ Plug # 2	14.02.2006
Lost Circ Plug # 3	15.02.2006
Cement 13 3/8" Casing	20.02.2006
Cement Grouting Job	21.02.2006
Cement 9 5/8" Casing	09.03.2006
Cement 7" Liner	15.03.2006

30" Conductor:

General Information:

WELL DATA - 30" CONDUCTOR					
Casing Depth, MD	[m]	± 186	BHST	[°C]	12
Casing Depth, TVD	[m]	± 186	BHCT	[°C]	12
Casing Size	["]	30	WOC Time	[hrs]	± 6
Conductor Thickness	["]	1/1,5	Mud Type		WBM
Slurry Volume	[m ³]	± 50	Mud Weight	[SG]	1.20
Hole Size	["]	36	TOC, MD	[m]	Seabed @ 126
OH Excess	[%]	300**			

Slurry Recipe:

CEMENT SLURRY DESIGN & TEST RESULTS			
Slurry design:		Amount	Units
	Tuned Light XL blend	100	Kg*
	CaCl ₂ liquid	4,50	Lhk*
	NF-6	0,10	Lhk*
	Seawater	54,35	Lhk*
	Total Mix Fluid	58,95	Lhk*
	Surface Density	1,52	SG
	Downhole Density	1,53	SG
	Surface Yield (ADC Mixing)	106,37	Liter/100kg*
	Downhole Yield (volume calcs)	105,78	Liter/100kg*
Lab reference	Thickening Time at 70°F:		
Id: 468-3	Time to 30 BC	2:42	hr:min
	Time to 70 BC	3:45	hr:min
	Time to 100 BC	4:58	hr:min
	API Free Water	0	%
	Density top/bottom	1,52 / 1,52	SG
	Rheology at mix / BHST	103 / 117	300-rpm
		85 / 94	200-rpm
		65 / 68	100-rpm
		55 / 56	60-rpm
		45 / 43	30-rpm
		21 / 23	6-rpm
		17 / 17	3-rpm
	UCA compressive strength	04:32 hr:min	50-psi
		12:32 hr:min	500-psi
		40 hr	1350-psi

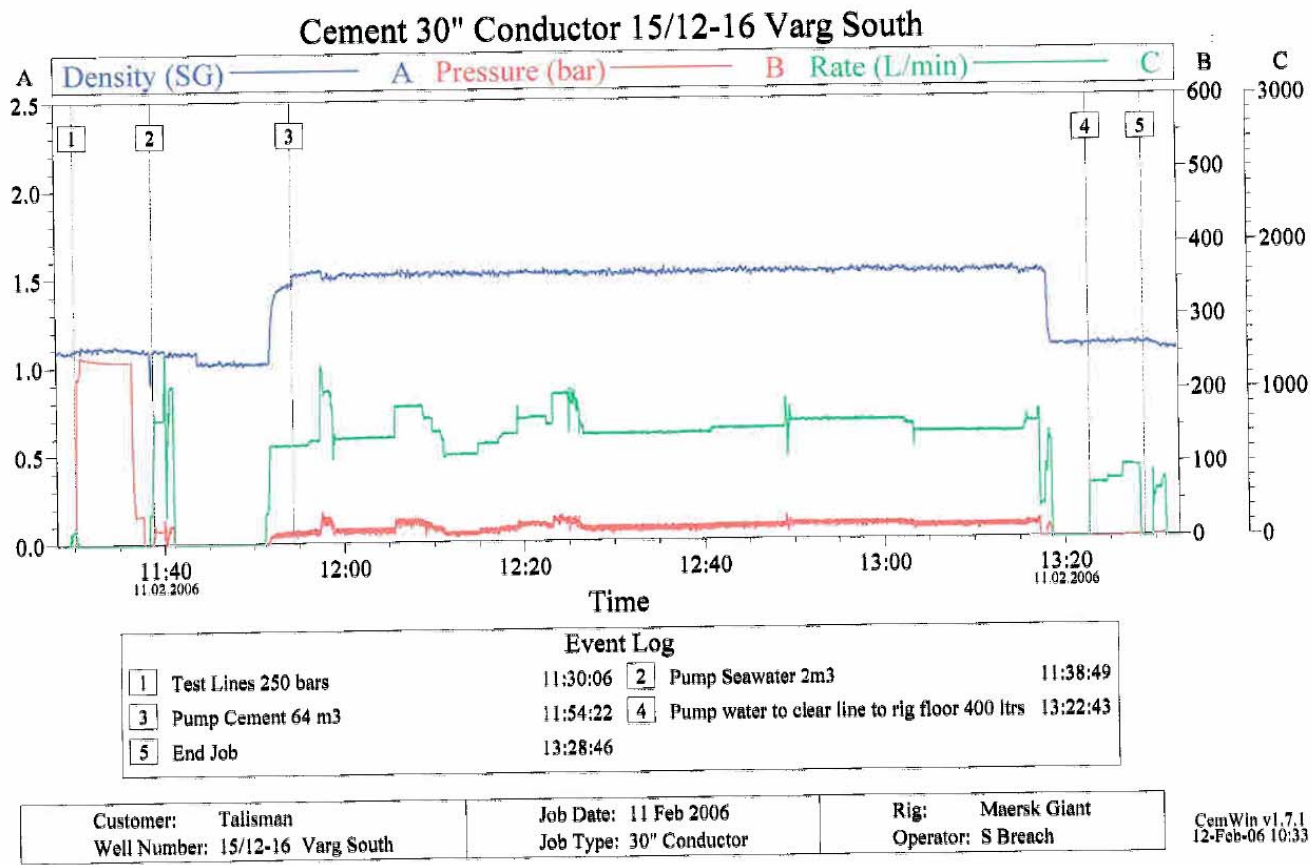
Job Execution Cementing Conductor 11.02.2006:

1. Ran in hole with 30" conductor to 187 m.
2. Made up and ran in hole with cement stinger on 5" drill pipe, stung in same with 10 tons. Rigged up cement stand.
3. Displaced well to seawater (30 m³, 1500 lpm).
4. Performed tool box meeting prior to cement job.
5. Connected cement line to cement head, pressure tested same 250 bar/5 min, ok.
6. Mixed and pumped 64 m³ 1.52 sg Tuned Light XL cement slurry .
7. Displaced surface lines with 400 ltr seawater.
8. Pulled stinger out of shoe to allow cement to u-tube, rigged down cement hose and racked back cement stand.
9. Dropped 2 wiper balls and flushed 5" drill pipe (stinger) with 2.5 m³ seawater.
10. Pulled out of hole with cement stinger.

Experiences/Conclusions / Focus Points

- Tuned Light XL job done as planned.
- Drilled out cement shoe and rat hole from 183 m to 186,9 m
- Observed total loss of return after drilling out cement and flow coming outside the 30" conductor.

Job Chart:



Cementing Lost Circulating Plug # 1

Due to lost circulation below the 30" conductor shoe, three additional cement plugs was set to cure the losses. The tail slurry for the conductor was used.

Slurry Recipe:

The following slurry design was used for the lost circulation plugs on Varg South.

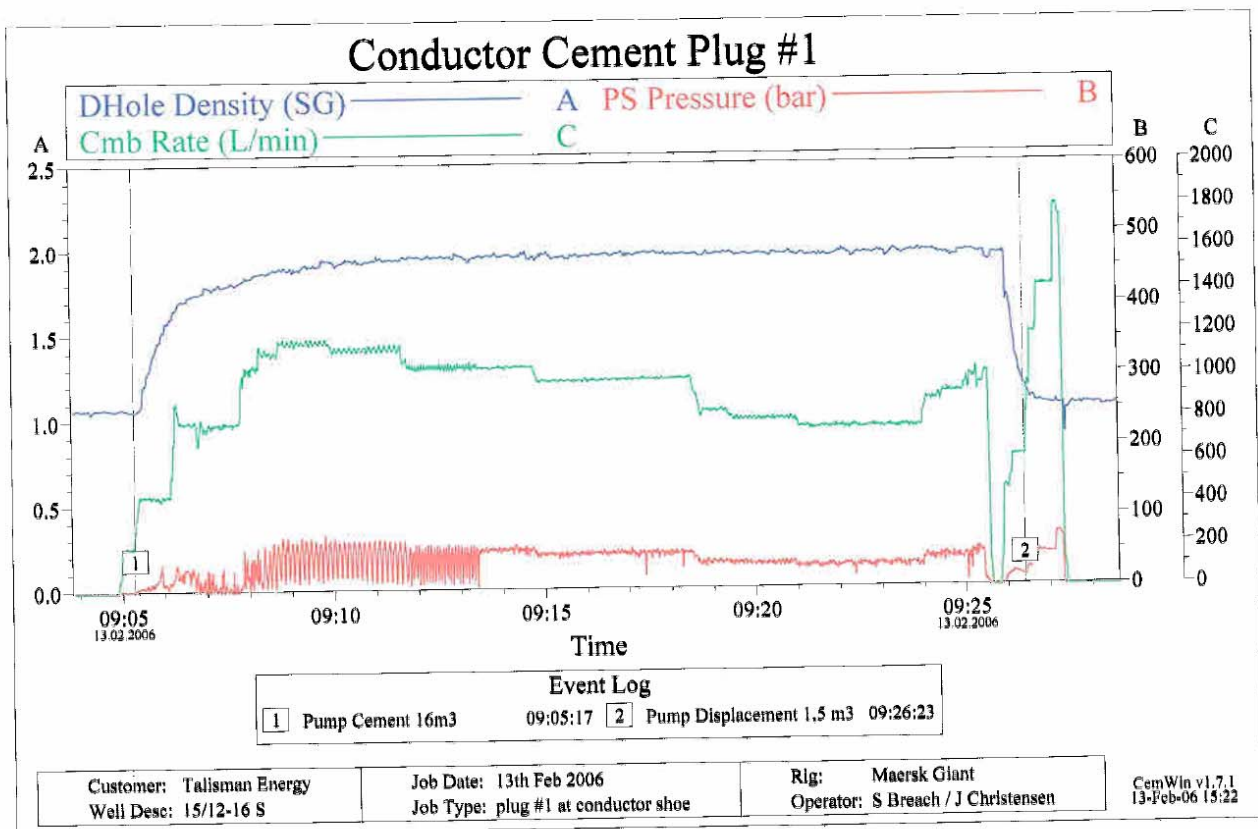
CEMENT SLURRY DESIGN & DATA				
Slurry design	Dyckerhoff class "G" Cement w/ 0.1% EZ-FLO	Amount:		Units
		Lead	Tail	
	Econolite	3.20		Liter/100kg
	Liquid CaCl ₂		4.33	Liter/100kg
	NF-6	0.10	0.10	Liter/100kg
	Sea Water	94.77	39.37	Liter/100kg
	Density	1.56	1.95	SG
	Total Mix Fluid	98.07	43.80	Liter/100kg
	Yield	129.22	74.95	Liter/100kg
	<u>Typical data for</u>			
	Thickening Time at 9 °C:			
	Time to 70 BC	>7	3:45	Hrs
	Minimum required hang off strength	8 hrs		100 psi

Job Execution 21.12.2005:

1. Performed tool box meeting prior to cement job.
2. Hooked up cement line to cement stand. Pressure tested cement line, 250 bar/5 min, ok.
3. Mixed and pumped 16 m3 1,95 sg cement slurry.
4. Removed cement hose and cement stand. Pulled out of hole to 140 m.
5. Dropped sponge ball to flush pipe.
6. Pumped 12 m3 of seawater.
7. Pulled out of hole with cement stinger.
8. Broke down cement stand and cleared rig floor.

Tagged cement at 185m. Drilled cement from 185-187m with 2500 lmp. Still losses.

Job Chart:



Cementing Lost Circulating Plug # 2:

On lost circulation plug # 2 both the lead and tail slurry was pumped, due to lack of additives for the tail slurry.

Job Execution 14.02.2006:

1. Made up and ran in hole with cement stinger to 186 m.
2. Made up cement assembly and hooked up cement hose. Pressure tested cement lines 250 bar/5 min, ok.
3. Performed tool box meeting prior to cement job.
4. Mixed and pumped 30 m3 1.56 sg lead cement slurry.
5. Mixed and pumped 12 m3 1.95 tail cement slurry.
6. Pumped wiper ball and one string volume to clean the pipe.
7. Monitored level inside conductor.
8. Filled stand with seawater and continued displacing cement, pumped 3.7m3 in Total.
9. Standpipe pressure increased to 7 bar during pumping.
10. Pressure dropped then rapidly as the formation was broken down.
11. Observed fluid level inside conductor fell back down to sea level.
12. Pulled cement stinger out of hole.

Tagged cement at 185 m and drilled cement to 188 m. Circulated bottoms up. Loss rate: 4,5m3/hr.

Job Chart:



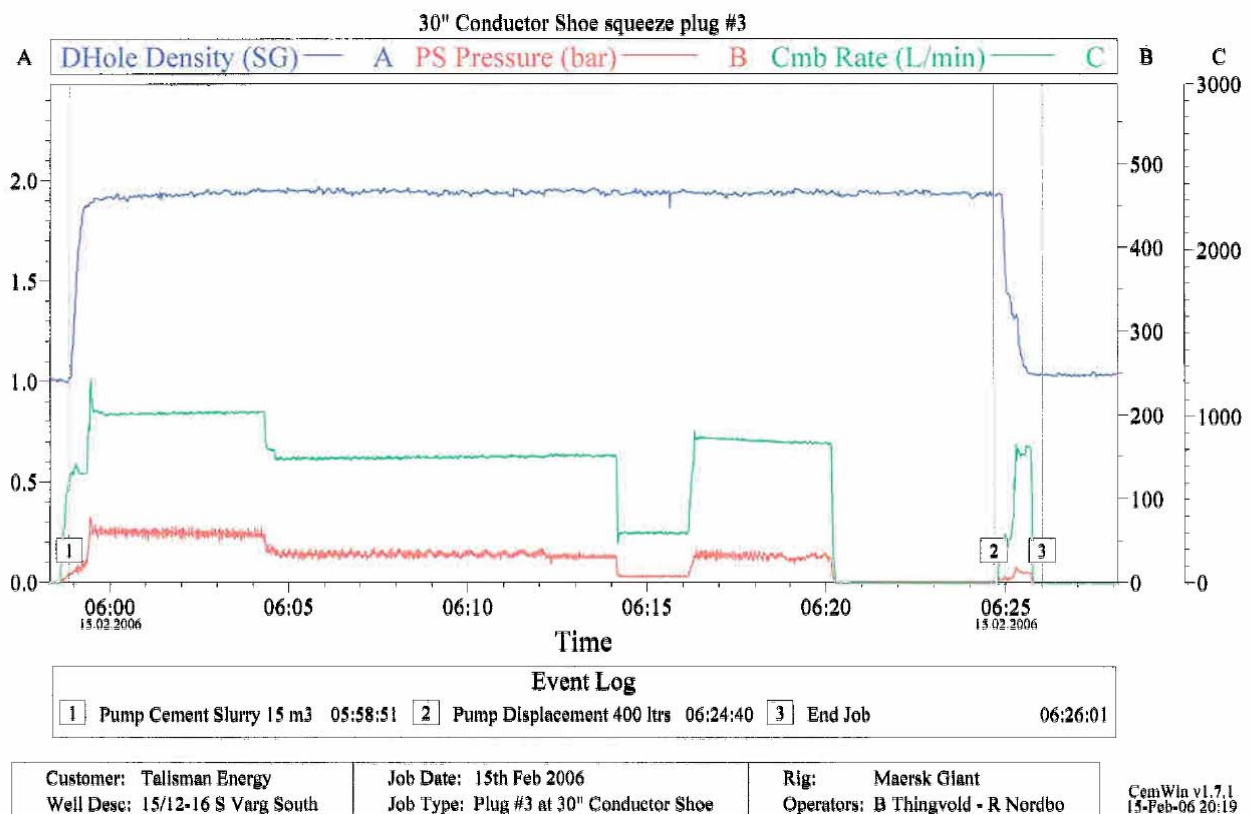
Cementing Lost Circulating Plug # 3:

Job Execution 15.02.2006:

1. Made up and ran in hole with cement stinger.
2. Performed tool box meeting prior to cement job.
3. Made up cement assembly and hooked up cement hose. Pressure tested cement lines 250 bar/5 min, ok.
4. Mixed and pumped 12 m3 1.95 tail cement slurry.
5. Pumped wiper ball and one string volume to clean the pipe..
6. Pulled cement stinger out of hole.

Tagged cement at 181 m and drilled cement to 215 m.

Job Chart:



13 3/8" Intermediate Casing

General Information:

WELL DATA – 13 3/8" SURFACE CASING					
Casing Depth, MD	[m]	± 1287	BHST	[°C]	55
Casing Depth, TVD	[m]	± 1279	BHCT	[°C]	39
Casing Size	["]	13 3/8	WOC Time	[hrs]	± 24
Casing Weight	[lb/ft]	72	Mud Type		WBM
Slurry Volume (Lead/Tail)	[m ³]	101/20	Mud Weight	[SG]	1,25
Hole Size	["]	17 ½	TOC	[m]	Seabed @ 126
OH Excess	[%]	40			

Spacer Recipe:

Spacer: 1,5 times the casing volume of Sea Water

Job Execution Cementing 13 3/8" Casing 20.02.2006:

- Ran the 13 3/8" casing to 1313 mMD. Landed off in mudline hangar.
- Installed cement head and lines
- Circulated 100 m³ of seawater, 3000 lpm.
- Performed tool box meeting.
- Pressure tested cement line to 250 bar/10 min -ok.
- Released bottom plug.
- Mixed and pumped 101m³ 1.56 sg laed slurry.
- Mixed and pumped 20 m³ 1.92 sg cement slurry.
- Released top plug, displaced cement slurry, no losses.
- Bumped plug at 6214 strokes, 97% efficiency.
- Lined up cement unit and pressure tested 13 3/8" casing to 210 bar/10 min, ok.
- Rigged down cement head and cement hose.

Slurry Recipe:

CEMENT SLURRY DESIGN & TEST RESULTS				
Slurry design:	Dyckerhoff "G" + 0,1% Ez-Flo	Lead	Tail	Units
	Econolite	3,2	-	ltr/100 kg
	CFR-8L	-	0,50	ltr/100 kg
	HR-4L	2,4	0,50	ltr/100 kg
	NF-6	0,1	0,10	ltr/100 kg
	Sea water	93,2	-	ltr/100 kg
	Fresh water	-	42,81	ltr/100 kg
Test results	Density	1,56	1,92	SG
	Total Mix Fluid	98,9	43,91	ltr/100 kg
	Yield	130,06	75,09	ltr/100 kg
	<u>Thickening Time at BHCT</u>			
	Time to 30 BC	6:19	4:07	Hrs:Mins
	Time to 70 BC	7:13	4:26	Hrs:Mins
	Time to 100 BC	7:32	4:41	Hrs:Mins
Lab reference:				
474 (Lead)				
475 (Tail)				
	SG top/bottom	1,56/1,56	1,92/1,92	% SG / SG cc/30 min
	Fann readings at BHCT	15	35	300 RPM
		13	24	200 RPM
		10	13	100 RPM
		9	9	60 RPM
		8	6	30 RPM
		7	4	6 RPM
		7	3	3 RPM
	UCA compressive strength	9:18	6:39	50 PSI
			8:52	500 PSI
		290 PSI	2230 PSI	
		@ 45 hrs	@18:00	

Job Chart:



Grouting Job

Slurry Recipe

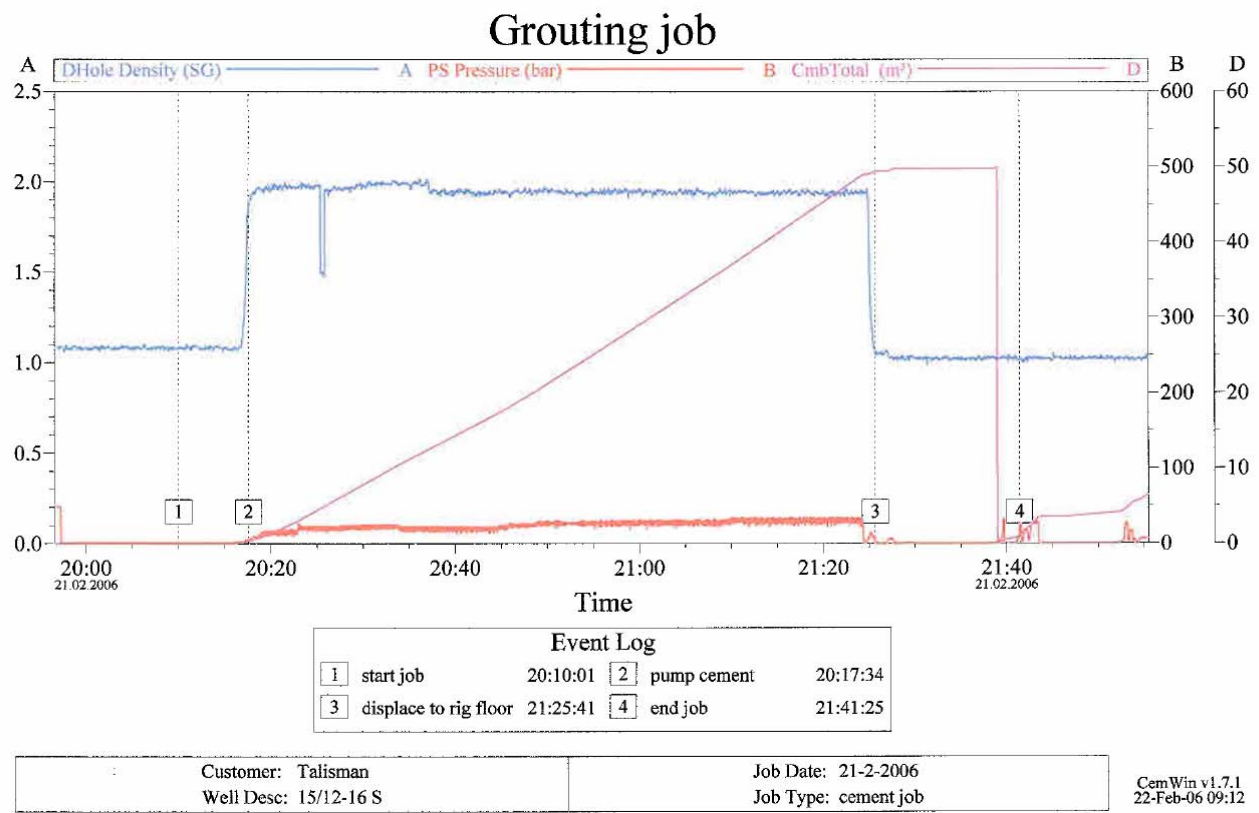
CEMENT SLURRY DESIGN & DATA			
Slurry design	Dyckerhoff class "G" Cement w/ 0.1% EZ-FLO	Amount:	Units
		Tail	
	Econolite		Liter/100kg
	Liquid CaCl ₂	4.33	Liter/100kg
	NF-6	0.10	Liter/100kg
	Sea Water	39.37	Liter/100kg
	Density	1.95	SG
	Total Mix Fluid	43.80	Liter/100kg
	Yield	74.95	Liter/100kg
	<u>Typical data for</u>		
	Thickening Time at 9 °C:		
	Time to 70 BC	3:45	Hrs
	Minimum required hang off strength	8 hrs	100 psi

Job Execution Grouting Job 21.02.2006:

Summary of Events First Stage:

- Installed 13 3/8" cement head.
- Performed tool box meeting.
- Pressure tested rig up from cement unit to rig floor: 250 bar/10 min, ok. Discovered leakage between cement head and landing string. Lifted off cement head, inspected seals. Pressure tested-ok. Prepared for cement job.
- RIH with mule shoe on 3 1/2" DP through guide shoe in Texas deck.
- Entered crater, tagged TOC at 142 m (15.5 m below seabed) .
- Performed tool box meeting prior to cement job.
- Pressure tested lines to rig floor, 150 bar/5min-ok.
- Mixed and pumped 49 m3 1,95 sg cement slurry. Observed cement out of crater after 40 m3 pumped.
- Dropped wiper balls and installed side entry sub. Flushed with seawater.
- Pulled out of hole with stinger.

Job Chart:



9 5/8" Casing

General Information:

WELL DATA – 9 5/8" Casing					
Casing Depth, MD	[m]	± 2871	BHST	[°C]	115
Casing Depth, TVD	[m]	± 2819	BHCT (API)	[°C]	76
Casing Size	["]	9 5/8	WOC Time	[hrs]	± 24
Casing Weight	[Lb/ft]	53,5	Mud Type	WBM	Performadril
Slurry Volume (lead/tail)	[m ³]	15 / 9	Mud Weight	[SG]	1,55
Hole Size	["]	12 ¼	Volume spacer	[m ³]	15
Length Shoetrack	[m]	36	Spacer type		Tuned Spacer
OH Excess	[%]	25	TOC, Lead	[mMD]	± 2257
			TOC, Tail	[mMD]	±2671

Spacer recipe:

SPACER DESIGN & DATA				
Volume:	15 m ³ ahead	Amount	Unit	Order of addition
Spacer design Per 1 m³:	Drill water	802,5	Liter	1 Check Chlorides
	NF-6	3,0	Liter	2 Disperse in water
	Tuned Spacer E+	29,0	Kg	3 Yield min. 1/2 hour
	Barite	766,6	Kg	4 Weigh up to initial SG
	Final density	1,60	SG	
Typical data	Rheology at BHCT:	56 35 28 20 6 5	300 200 100 60 30 6 3	

Job Execution 9 5/8" Casing, 09.03.2006:

- RIH with 9 5/8" casing, landed at 2826
- Installed cement head and lines
- Circulated 100 m³ of seawater, 3000 lpm.
- Pressure tested cement line to 345 bar/10 min -ok.
- Circulated one casing volume of 105m³
- Pumped 15 m³ of 1.59 sg spacer
- Mixed and pumped 14.8m³ 1,65 sg lead slurry.
- Mixed and pumped 13.3 m³ 1,90 sg cement slurry.
- Displaced with 1,59 sg mud at 2000 lpm. Pumped 6552 strokes including ½ shoetrack without bumping the plug. No backflow.
- Rigged down cement head and cement hose.

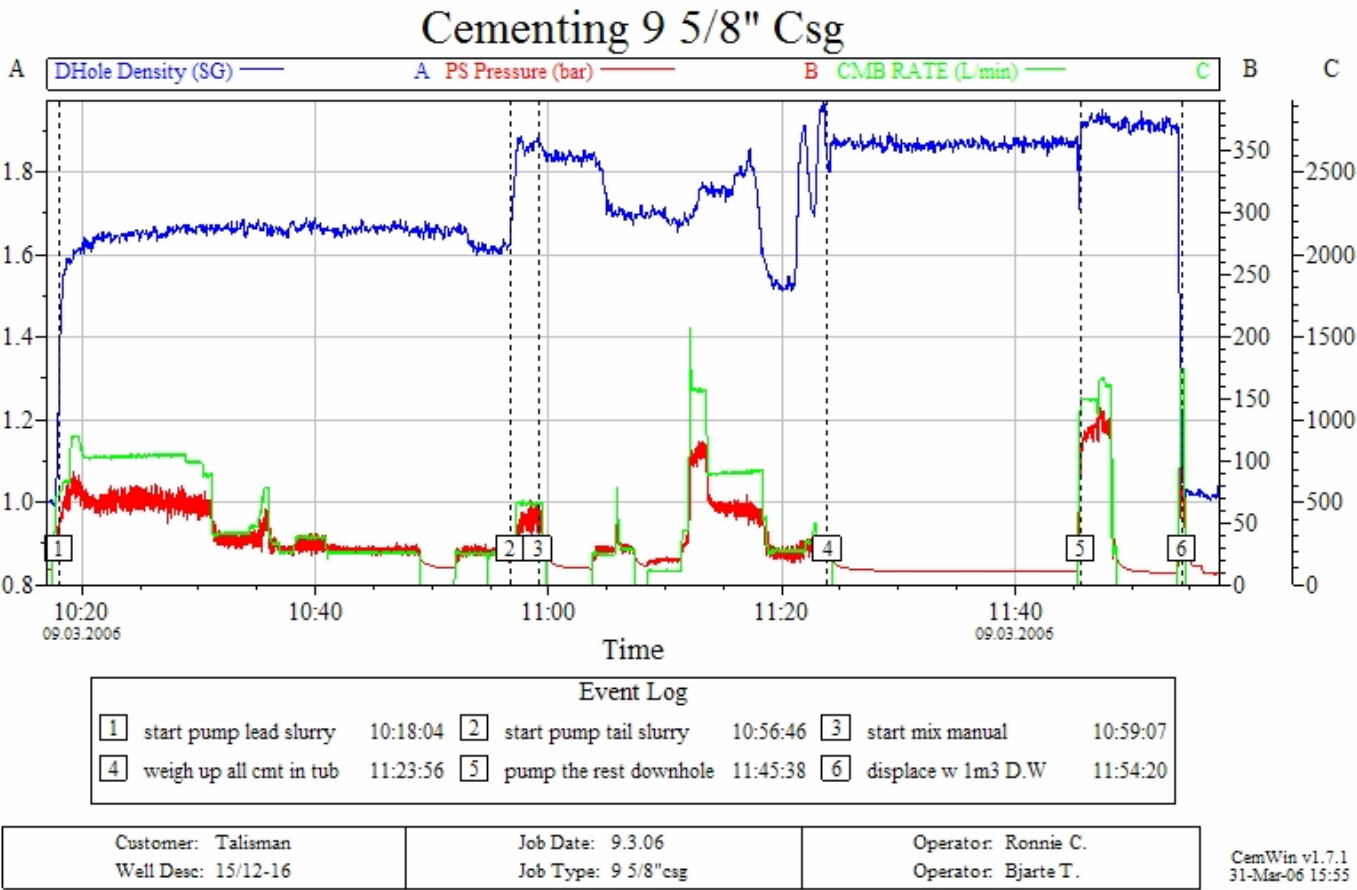
Slurry Recipe:

CEMENT SLURRY DESIGN & TEST RESULTS				
		Lead	Tail	Units
Basis Cement	Dyckerhoff Class G			
Stength Retrogression	SSA-1 (silica)	35	35	%BWOC
Bulk flow improver	Ez-Flo	0,1	0,1	%BWOC
Viscosifier	Bentonite Prehydrated	1,5	-	%BWOC
Gas Migration Prevention	Gascon	7,0	5,4	ltr/100 kg
Fluid Loss Control	Halad 350L	-	5,4	ltr/100 kg
Fluid Loss Control	Halad 413L	9,0	-	ltr/100 kg
Dispersant	CFR-8L	1,0	2,5	ltr/100 kg
Retarder	HR-5L	3,5	2,3	ltr/100 kg
Defoamer	NF-6	0,1	0,1	ltr/100 kg
	Fresh water	78,25	42,32	ltr/100 kg
	Density	1,65	1,90	SG
	Total Mix Fluid	99,42	58,02	ltr/100 kg
	Yield	143,9	102,51	ltr/100 kg
Test results:	<u>Thickening Time at 225°F:</u>			
Lab references	Time to 30 BC	6:13	5:00	hr:min
525-22 (Lead)	Time to 70 BC	6:27	6:20	hr:min
526-3 (Tail)	Time to 100 BC	6:33	6:32	hr:min
	API Free Water	0	0	%
	Density top/bottom	1,61/1,65	1,90/1,90	ppg/ppg
	API Fluid Loss	40	40	cc/30-min
	Rheology at mix/BHCT	72 43	228 143	300-rpm
		53 32	162 105	200-rpm
		32 18	89 61	100-rpm
		22 13	56 44	60-rpm
		13 8	31 25	30-rpm
		5 3	8 11	6-rpm
		3 2	5 31	3-rpm
	UCA strength (Initial set)		14:41	50 psi
		>200 psi	14:57	500 psi
			1700	Psi after 24 hr

Experiences/Conclusions / Focus Points

- Drilled out cement from 2597 m to 2709 m.
- Mini investigation was performed after cement unit software problem and plug not bumping.

Job Chart:



7" Liner

General Information:

WELL DATA – 7" Liner					
Liner Depth, MD	[m]	± 3041	BHST	[°C]	122
Liner Depth, TVD	[m]	± 2972	BHCT	[°C]	83
Liner Size	["]	7	WOC Time	[hrs]	± 24
Liner Weight	[Lb/ft]	32	Mud Type		OBM
Slurry Volume	[m ³]	±9	Mud Weight	[SG]	±1,10
Hole Size	["]	8 ½	TOC, MD	[m]	± 2721
OH Excess		25% + 100 m on TOL			

Spacer Recipe:

SPACER DESIGN & DATA				
Volume:	15 m ³ ahead + 1m ³ behind DP plug	Amount	Unit	Order of addition
Spacer design Per 1 m³:	Drill water	836	Liter	1 Check Chlorides
	NF-6	3	Liter	2 Disperse in water
	Tuned Spacer E+	32	Kg	3 Yield min. 1/2 hour
	Barite	635	Kg	4 Weigh up to initial SG
	Initial SG	1.52	SG	
	Final density	1.50	SG	

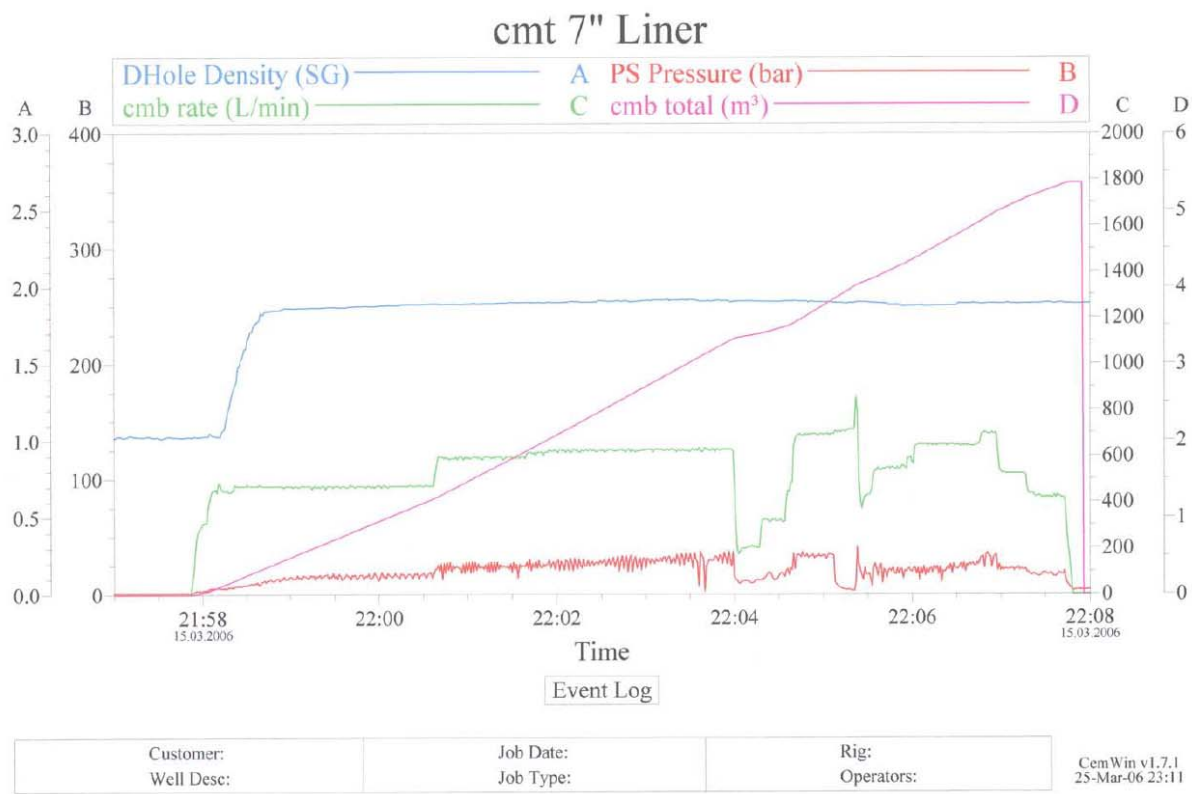
Job Execution Cementing 7" Liner, 15.03.2006:

- RIH with 7" liner, landed at 2956. Set liner hanger
- Circulated 2 times bottom up to condition the mud prior the cement job.
- Installed cement head and lines
- Pressure tested cement line to 345 bar/10 min -ok.
- Pumped 15 m³ of 1.50 sg spacer
- Mixed and pumped 5 m³ 1,90 sg cement slurry.
- Displaced with mud pump. Bumped plug with 100% pump efficiency
- Pressure tested liner to 345 bar/10 min using the cement unit
- Set liner packer.

Slurry Recipe:

CEMENT SLURRY DESIGN & TEST RESULTS			
Basis Cement:	Dyckerhoff "G"		Units
Stength Retrogression	SSA-1 (silica)	35	35
Bulk flow improver	Ez-Flo	0,1	0,1
Gas Migration Prevention	Gascon	5,40	ltr/100 kg
Dispersant	CFR-8L	2,00	ltr/100 kg
Fluid Loss Control	Halad 350L	5,40	ltr/100 kg
Retarder	HR-5L	2,6	ltr/100 kg
Defoamer	NF-6	0,10	ltr/100 kg
	<u>Fresh water</u>	42,49	ltr/100 kg
	Density	1,90	SG
	Total Mix Fluid	57,99	ltr/100 kg
	Yield	102,47	ltr/100 kg
Test results	<u>Thickening Time at BHCT</u>		
	Time to 30 BC	06:45	Hrs:Mins
	Time to 70 BC	07:02	Hrs:Mins
	Time to 100 BC	07:05	Hrs:Mins
Lab reference			
544	API Free Water, vertical	0	%
	SG top/bottom	1,90/1,90	SG / SG
	API fluid loss at BHCT	33	cc/30 min
	Fann readings at BHCT	145	300 RPM
		100	200 RPM
		55	100 RPM
		35	60 RPM
		19	30 RPM
		5	6 RPM
		3	3 RPM
	API gel strength, 10sec/min	3/13	CP
	UCA compressive strength	16:24	50 psi
		17:06	500 psi
		24:00	1980 psi

Job Chart:



Material Usage and Discharge:

In the tables below the total usage and discharge are broken down into the belonging cement operations.

**Usage and discharge pr. Section
Well 15/12-16S Varg South**

30" conductor

Product	Usage	Unit	Destruction	Left in well	Reinjected	To Sea
Tuned Light XL	50	MT		48		2
CaCl2 liquid	3300	ltr		2950		350
NF-6	60	ltr		55		5

Lost circulation below 30" conductor - nr. 1 (unplanned)

Product	Usage	Unit	Destruction	Left in well	Reinjected	To Sea
Dyckerhoff G	21	MT		21		
EzFlo	21	kg		21		
CaCl2 liquid	800	ltr		800		
NF-6	20	ltr		20		

Lost circulation below 30" conductor - nr. 2 (unplanned)

Product	Usage	Unit	Destruction	Left in well	Reinjected	To Sea
Dyckerhoff G	40	MT		40		
EzFlo	40	kg		40		
Econolite	700	ltr		700		
CaCl2 liquid	700	ltr		700		38
NF-6	40	ltr		40		

Lost circulation below 30" conductor - nr. 3 (unplanned)

Product	Usage	Unit	Destruction	Left in well	Reinjected	To Sea
Dyckerhoff G	23	MT		22,5		0,5
EzFlo	23	kg		22,5		0,5
CaCl2 liquid	1150	ltr		1100		50
NF-6	19,5	ltr		19		0,5

13 3/8" casing

Product	Usage	Unit	Destruction	Left in well	Reinjected	To Sea
Dyckerhoff G	106	MT		106		
EzFlo	106	kg		106		
CFR-8L	280	ltr		280		
Econolite	2150	ltr		2150		
HR-4L	2000	ltr		2000		
NF-6	60	ltr		60		

Grouting Job (unplanned)

Product	Usage	Unit	Destruction	Left in well	Reinjected	To Sea
Dyckerhoff G	60	MT		60		
EzFlo	60	kg		60		
CaCl2 liquid	2950	ltr		2950		
NF-6	60	ltr		60		

9 5/8" casing

Product	Usage	Unit	Destruction	Left in well	Reinjected	To Sea
Dyckerhoff G	28	MT		28		
EzFlo	106	kg		106		
SSA-1	9800	kg		9800		
CFR-8L	496	ltr		490		6
Gascon 469	1370	ltr		1355		15
Halad-350L	550	ltr		545		5
Halad-413L	1000	ltr		1000		
HR-5L	520	ltr		515		5
Tuned Spacer E+	552	kg		552		
NF-6	76	ltr		76		

7" Liner

Product	Usage	Unit	Destruction	Left in well	Reinjected	To Sea
Dyckerhoff G	5	MT		5		
EzFlo	6,7	kg		6,7		
SSA-1	1700	kg		1700		
CFR-8L	110	ltr		108		0,2
Gascon 469	270	ltr		265		5
Halad-350L	270	ltr		265		5
HR-5L	135	ltr		133		2
Tuned Spacer E+	576	kg		570		6
NF-6	60	ltr		55		5

11.4 Bit Record

Drill Bit Evaluation Report



Well: 15/12-16S

**Varg
Norway**



	Bit Dimension	Manufacturer	Bit Type	Serial No	No Rr	Iadc Bitcode	Nozzles	Tfa	Depth Out	TVD In	TVD Out	Meters Drilled	Hours	Rop	Rpm Min	Rpm Max	Wob Min	Wob Max	Flow Min	Flow Max	Pressure Min	Pressure Max	Dull grad	
1	17 1/2"	SDBS	XTD12DSC	755558	RR3	435M	4x20		1,2270	191,0	126	191,0	65,0	17,3	3,8	0	45	2,0	2,0	2100	4400	20	83	1 1 WT A E I NO TD
2	17 1/2"	SDBS	EBXT02DSLC	10779090		415W	1x18, 2x20, 1x22		1,2340	207,0	191	207,0	15,5	,9	17,6	45	45	3,0	3,0	3000	3000	78	78	na HP
3	17 1/2"	SDBS	EBXT1GSLC	10627777	RR1	115W	1x18, 2x20, 1x22		1,2340	215,0	207	215,0	8,0	1,0	8,0	80	80	2,0	2,0	4500	4500	80	80	1 1 WT A E I NO HP
4	24"	SDBS	XT1DSLC	10730375	RR1	115G	4x20		1,2270	215,0	215	215,0	,0	,0	,0									1 1 WT A E I NO TD
5	17 1/2"	SDBS	EBXT02DSLC	10779090	RR1	415W	1x18, 2x20, 1x22		1,2340	1319,0	215	1310,0	1104,0	27,8	39,7	40	100	2,0	20,0	3200	4500	80	203	1 2 WT A E I NO TD
6	12 1/4"	SDBS	FMF3643ZSC	10793757		M133	2x14, 4x15		,9910	1365,0	1310	1355,0	46,0	7,0	6,6	80	120	3,0	8,0	3200	3600	143	231	DTF
7	12 1/4"	SDBS	FMF3643ZSC	10793757		M133	9x12		,9940	2355,0	1355	2332,0	990,0	49,5	20,0	135	145	5,0	15,0	2475	3600	200	280	3 2 CT N X I NO ROP
8	12 1/4"	SDBS	FMF3961ZS	10719632		M222	9x12		,9940	2474,0	2332	2449,0	119,0	19,5	6,1	100	140	1,0	20,0	3550	3690	280	295	DTF
9	12 1/4"	SDBS	FMF3961ZS	10719632	RR1	M222	9x12		,9910	2835,0	2449	2786,0	361,0	35,5	10,2	120	150	7,0	13,0	3300	3700	285	305	2 1 CT T X I WT TD
10	8 1/2"	SDBS	FM3755Z	10716385	RR3	M422	4x18		,9940	2961,0	2786	2897,0	126,0	8,0	15,8	130	140	5,0	8,0	1920	2000	110	135	1 2 WT S X I CT TD



System	Group	Formation	MD (M)	Bit run	Comments
Tertiary	Nordland	Undiff	192	EBXT02DSL 15.5 m 0.9 hrs 17.6 m/hr Bit run 1 NOT SEEN sn: 10779090	The cement was tagged at 183m and drilled with 2-3T at 3000lpm and 45 RPM. Theshoe was seen at 185.5 m and drilled very slowly. Soft cement was seen after 186m. The string was worked several times through the shoe while drilling the shoe track. After drilling out the rathole to 191.5m, 2 x 10 cubic metre hi vis pills were pumped. Drilling formation continued from 191.5m while pumping the second pill out, however serious losses were noted at 192m. At 194m the string was pulled back to 180m in order to monitor the losses which were seen to be running at 60 cubes per hour. The assembly was then run back in hole to 183m where circulation was broken. Cement was tagged at 197m with 3000lpm. Flow was increased to 4500lpm and the cement was reamed out with 1-2T WOB and 80rpm to 207m. Samples were taken showing 95% cement indicating the old hole was followed. Drilling 8 metres of formation continued from 207-215m at 15m/hr again with a low WOB. Losses while drilling at 4500lpm were ±12m³/hr. The hole was circulated clean prior to tripping to run a cement stinger. The Kick-off was initiated at 220m MD utilising the Evader Gyro MWD. No problems were encountered sliding or maintaining a steady toolface. ROPs were very fast at 70-80m/hr with 1-2T WOB.
			207	EBXT1GSLC 8 m 1 hrs 8 m/hr Bit run 3 0-0-NO-A-E-I-NO-HP sn: 10627777	
			215	EBXT02DSL 1104 m 27.8 hrs 39.7 m/hr Bit run 5 1-2-WT-A-E-I-NO-TD sn: 10779090	
	Hordaland	Undiff	1181		Drilling continued along the proposal building to ±11deg inc. Maximum dog-leg produced was 2.16deg/30m, with ROPs ranging between 40-70m/hr. The Utsira formation came in ±6 deeper than prognosed. Controlled ROP at 40-50 m/hr. Rotary drilling continued through the Hordaland formation. This formation firmed up and required more weight as above to maintain ROP. Section TD was called at 1319m MD. No hole problems were encountered.
			1257		
			1319	TD	

SDBS recommendation: The assembly performed well achieving its objectives and should be considered for similar applications.

Drill bits Performance summary
Well 15/12-16S
Section 12 1/4"



System	Group	Formation	MD (M)	Bit run	Comments
Tertiary	Hordaland		1319	FMF3643CSC 46 m 7 hrs 6.6 m/hr Bit run 1 0-0-NO-A-X-I-NO-DTF sn: 10699019	Washed down and tagged at 1276m., before drilling float collar and cement. Drilled shoe and cleaned rathole and drilled 3m formation prior to performing LOT Carried out displacement to 1.55 SG mud according to the agreed procedure with 2 semi weighted spacers. Set GeoPilot to zero deflection and drilled 15 mts of hole to get MWD Assy clear of the shoe. Set GeoPilot to 30% deflection at 60 left toe effect a soft left turn. GeoPilot held the deflection for 5 mts then started to go erratic, finally locking at 85% deflection at 30 right. Stopped drilling at 1365 mts and pulled off btm.
			1365	FMF3643CSC 990 m 49.5 hrs 20 m/hr Bit run 2 3-2-CT-N-X-I-NO-ROP sn: 10699019	After washing to bottom and drilling 4 meters of formation, the hole started to pack off. As soon as the bit was returned to bottom the assembly started to pack off again. It was eventually possible to work the bit to bottom and recommence drilling. ROP had to be carefully controlled and further packoffs occurred whenever the rate increased. At 1406m a wiper trip to the shoe was made, 2m of fill were found on returning to bottom and thereafter drilling became less problematic and the ROP could be increased gradually to 50m/hr High ROP's were maintained but these slowed once the Balder formation was encountered. At 2355m, 33m into the Lista formation, ROP slowed to 3m per hour and, even though a wide range of different parameters were tried, it was impossible to improve this.
	Rogaland	Balder/Sele/Lista/Vale	2259		
			2355	FMF3961ZS 119 m 19.5 hrs 6.1 m/hr Bit run 3 0-0-NO-A-X-I-NO-DTF sn: 10719632	Cut a profile for the new bit. After this drilling parameters were varied constantly in an effort to improve ROP, but no better than 10m/hr average. The proposed build and turn was initiated at 2420 as planned. GeoPilot failure. It was decided to drill as far as the Shetland chalk to see if the bit would perform better in this formation. Before pulling out drilling was continued to 2474 and an ROP of 35m/hr was achieved.
Cretaceous	Shetland	Ekofisk	2450		
		Tor / Hod / Blodøks	2455		
	Cr. Kn	Hidra	2474	FMF3961ZS 361 m 361 hrs 10.2 m/hr Bit run 4 2-1-CT-T-X-I-WT-TD sn: 10719632	Commenced drilling and immediately deflected GeoPilot in order to catch up with the delayed turn and build. This was done without problem and the well was on track at 2766m.
		Rodby / Sola / Asgard	2680		
Jurassic	Viking		2683		
	Draupnir		2783		
			2835	TD	

SDBS recommendation: Similar BHA

Drill bits Performance summary
Well 15/12-16S
Section 8 1/2"



System	Group	Formation	MD (M)	Bit run	Comments
Jurassic	Viking	Draupne	2835	FM3755Z 126 m 8 hrs 15.8 m/hr Bit Run 1 1-2-WT-S-X-I-CT-TD sn:10716385	Drilled out shoetrack without problems.
		Heather	2871		The assembly built by approximately 0.3 deg/30m and held direction. Typical drilling parameters were WOB of 2 5 T at 130 rpm, with flowrate of 1900lpm and a SPP of 126 bar.
			2909		TD was called early when the samples showed traces of claystone confirming the bottom of the Heather formation had been reached. The reservoir thickness was only approximately 30m TVD thick, which was less than expected.
		Reservoir RZ1/RZ2/RZ3	2961		TD
SDBS recommendation: Run same bit type and BHA					

DULL GRADE REPORT

Operator TALISMAN
Rig MÆRSK GIANT
Well 15/12-16S
Field VARG

Bit Type XTD12DSC
Bit Size 17 1/2"
Serial No. 755558
IADC Code 435M

	Inner	Outer	Condition	Location	Bearings	Gauge	Other	POOH
SDBS Dull:	1	1	WT	A	E	I	NO	TD
Rig Dull:	12WTAEINOTD				SBDS Dull Date:		February 22, 2006	
Dull Remarks:	Wear on shirt tale							
Recommendation:	RERUNABLE							
Comments:	Used in front of 26"x36" HO							



Depth In (m)	126	Flow (lpm)	2100 - 4400	Mud Weight (sg)	1.03
Depth Out (m)	191	WOB (ton)	2 - 2	Drive System	PDM
Meters	65	RPM	0 - 45	Deviation in	0
Hours	17.3	Mud Type	SW	Deviation out	.4
ROP (m/hrs)	3.8	TFA (in2)	1.227	Max Dogleg	.2
TVD In (m)	126	TVD Out(m)	191		
Formation	Tophole				
Lithology					
Run	Meters	Hours	ROP		
	65	17.3	3.8		
Total	65	17			

DULL GRADE REPORT

Operator	TALISMAN	Bit Type	EBXT02DSLCL
Rig	MÆRSK GIANT	Bit Size	17 1/2"
Well	15/12-16S	Serial No.	10779090
Field	VARG	IADC Code	415W

	Inner	Outer	Condition	Location	Bearings	Gauge	Other	POOH
SDBS Dull:	na							HP
Rig Dull:	11WTAEINOHP				SBDS Dull Date:			
Dull Remarks:	NOT SEEN							
Recommendation:	RERUNABLE							
Comments:	The cement was tagged at 183m and drilled with 2-3T at 3000lpm and 45 RPM. Theshoe was seen at 185.5 m and drilled very slowly. Soft cement was seen after 186m. Drilling formation continued from 191.5m while pumping the second pill out, however serious losses were noted at 192m. It was decided to drill on to207m in order to allow space for a good cement plug							

No top view image

No side view image

Depth In (m)	192	Flow (lpm)	3000 - 3000	Mud Weight (sg)	1.5
Depth Out (m)	207	WOB (ton)	3 - 3	Drive System	PDM
Meters	15.5	RPM	45 - 45	Deviation in	.4
Hours	.9	Mud Type	WBM	Deviation out	.95
ROP (m/hrs)	17.6	TFA (in2)	1.234	Max Dogleg	
TVD In (m)	191	TVD Out(m)	207		
Formation	Nordland				
Lithology	Undiff				

Run	Meters	Hours	ROP	
	1104	27.8	39.7	
	15.5	.9	17.6	
Total	1119.5	27		

DULL GRADE REPORT

Operator	TALISMAN	Bit Type	EBXT1GSLC
Rig	MÆRSK GIANT	Bit Size	17 1/2"
Well	15/12-16S	Serial No.	10627777
Field	VARG	IADC Code	115W

	Inner	Outer	Condition	Location	Bearings	Gauge	Other	POOH
SDBS Dull:	1	1	WT	A	E	I	NO	HP
Rig Dull:	00NOAEINOHP				SBDS Dull Date:			
Dull Remarks:	Cone nr 1 very loose cone nr 2 loose. Wear shirt							
Recommendation:	SCRAP							
Comments:	Cement was tagged at 197m with 3000lpm. Flow was increased to 4500lpm and the cement was reamed out with 1-2T WOB and 80rpm to 207m. Samples were taken showing 95% cement indicating the old hole was followed. Drilling 8 metres of formation continued from 207-215m at 15m/hr again with a low WOB. Losses while drilling at 4500lpm were ±12m³/hr. The hole was circulated clean prior to tripping to run a cement stinger.							



Depth In (m)	207	Flow (lpm)	4500 - 4500	Mud Weight (sg)	1.5
Depth Out (m)	215	WOB (ton)	2 - 2	Drive System	N/A
Meters	8	RPM	80 - 80	Deviation in	.95
Hours	1	Mud Type	WBM	Deviation out	.84
ROP (m/hrs)	8	TFA (in2)	1.234	Max Dogleg	
TVD In (m)	207	TVD Out(m)	215		
Formation	Nordland				
Lithology	Undiff				

Run	Meters	Hours	ROP	
	8	1	8	
Total	8	1		

DULL GRADE REPORT

Operator TALISMAN
Rig MÆRSK GIANT
Well 15/12-16S
Field VARG

Bit Type XT1DSLCL
Bit Size 24"
Serial No. 10730375
IADC Code 115G

	Inner	Outer	Condition	Location	Bearings	Gauge	Other	POOH
SDBS Dull:	1	1	WT	A	E	I	NO	TD
Rig Dull:	00NOAEINOTD				SBDS Dull Date:		February 22, 2006	
Dull Remarks:	Wear on shirt tale							
Recommendation:	RERUNABLE							
Comments:	At 142m circulation was broken with 500lpm and the string was washed down to tag cement.At 170m no hard cement had been tagged. The hole was circulated, green cement returns were dumped at the shakers. The string was then washed down to the 20" Crossover at 181m with 4000lpm. No hard cement was tagged and no losses were observed.The assembly was pulled to run the drilling assembly.							



Depth In (m)	215	Flow (lpm)	-	Mud Weight (sg)	1.5
Depth Out (m)	215	WOB (ton)	-	Drive System	N/A
Meters	0	RPM	-	Deviation in	.84
Hours	0	Mud Type	WBM	Deviation out	.84
ROP (m/hrs)	0	TFA (in2)	1.227	Max Dogleg	
TVD In (m)	215	TVD Out(m)	215		
Formation	n/a				
Lithology					

Run	Meters	Hours	ROP	
	0	0	0	

DULL GRADE REPORT

Operator TALISMAN
Rig MÆRSK GIANT
Well 15/12-16S
Field VARG

Bit Type EBXT02DSLC
Bit Size 17 1/2"
Serial No. 10779090
IADC Code 415W

	Inner	Outer	Condition	Location	Bearings	Gauge	Other	POOH
SDBS Dull:	1	2	WT	A	E	I	NO	TD
Rig Dull:	11WTAEINOTD				SBDS Dull Date:		March 20, 2006	
Dull Remarks:								
Recommendation:	RERUNABLE							
Comments:	The assembly performed well achieving its objectives and should be considered for similar applications.							



Depth In (m)	215	Flow (lpm)	3200 - 4500	Mud Weight (sg)	1.5
Depth Out (m)	1319	WOB (ton)	2 - 20	Drive System	PDM
Meters	1104	RPM	40 - 100	Deviation in	.8
Hours	27.8	Mud Type	WBM	Deviation out	10.9
ROP (m/hrs)	39.7	TFA (in2)	1.234	Max Dogleg	.3
TVD In (m)	215	TVD Out(m)	1310		
Formation	Nordland, Hordaland				
Lithology	Claystone, Sandstone, Siltsone				

Run	Meters	Hours	ROP
	1104	27.8	39.7
	15.5	.9	17.6
Total	1119.5	27	

DULL GRADE REPORT

Operator	TALISMAN	Bit Type	FMF3643ZSC
Rig	MÆRSK GIANT	Bit Size	12 1/4"
Well	15/12-16S	Serial No.	10793757
Field	VARG	IADC Code	M133

	Inner	Outer	Condition	Location	Bearings	Gauge	Other	POOH
SDBS Dull:								DTF
Rig Dull:	00NOAXINODTF				SBDS Dull Date:			
Dull Remarks:								
Recommendation:	RERUNABLE							
Comments:	Washed down and tagged at 1276m., before drilling float collar and cement. Drilled shoe and cleaned rathole and drilled 3m formationprior to performing LOT							

No top view image

No side view image

Depth In (m)	1319	Flow (lpm)	3200 - 3600	Mud Weight (sg)	1.5
Depth Out (m)	1365	WOB (ton)	3 - 8	Drive System	Geo-Pilot
Meters	46	RPM	80 - 120	Deviation in	10.9
Hours	7	Mud Type	WBM	Deviation out	11.2
ROP (m/hrs)	6.6	TFA (in2)	.991	Max Dogleg	.46
TVD In (m)	1310	TVD Out(m)	1355		
Formation	Hordaland				
Lithology	Clay				

Run	Meters	Hours	ROP
	46	7	6.6
	990	49.5	20
Total	1036	56	

DULL GRADE REPORT

Operator	TALISMAN	Bit Type	FMF3643ZSC
Rig	MÆRSK GIANT	Bit Size	12 1/4"
Well	15/12-16S	Serial No.	10793757
Field	VARG	IADC Code	M133

	Inner	Outer	Condition	Location	Bearings	Gauge	Other	POOH
SDBS Dull:	3	2	CT	N	X	I	NO	ROP
Rig Dull:	42CTNXIWTROP				SBDS Dull Date:		March 15, 2006	
Dull Remarks:								
Recommendation:	SCRAP							
Comments:	High ROP's were maintained throughout the claystone.but these slowed once the Balder formation was encountered.At 2355m. 33m into the Lista formation ROP slowed to 3m per hour and , even though a wide range of different parameters were tried itwas impossible ro improve this.							



Depth In (m)	1365	Flow (lpm)	2475 - 3600	Mud Weight (sg)	1.5
Depth Out (m)	2355	WOB (ton)	5 - 15	Drive System	Geo-Pilot
Meters	990	RPM	135 - 145	Deviation in	11.2
Hours	49.5	Mud Type	WBM	Deviation out	9
ROP (m/hrs)	20	TFA (in2)	.994	Max Dogleg	.1
TVD In (m)	1355	TVD Out(m)	2332		
Formation	Hordaland, Rogaland; Balder, Sele, Lista				
Lithology	Claystone				

Run	Meters	Hours	ROP
	46	7	6.6
	990	49.5	20
Total	1036	56	

DULL GRADE REPORT

Operator	TALISMAN	Bit Type	FMF3961ZS
Rig	MÆRSK GIANT	Bit Size	12 1/4"
Well	15/12-16S	Serial No.	10719632
Field	VARG	IADC Code	M222

	Inner	Outer	Condition	Location	Bearings	Gauge	Other	POOH
SDBS Dull:								DTF
Rig Dull:	00NOAXINODTF				SBDS Dull Date:			
Dull Remarks:								
Recommendation:	RERUNABLE							
Comments:	The first metre was drilled with minimum parameters in order to cut a profile for the new bit.After this drilling parameters were varied constantly in an effort to improve ROP,but no better than 10m/hr average, and mostly less thanthis, could be achieved.The proposed build and turn was initiated at 2420 as planned but shortly afterwards it became apparent that the geopilot was not workingcorrectly and that it would not be posible to steer through the section.It was decided to drill as far as the Shetland chalk to see if the bit would perform better in this formation.Before pulling out drilling was continued to 2474 and an ROP of 35m/hr was achieved.							

No top view image

No side view image

Depth In (m)	2355	Flow (lpm)	3550 - 3690	Mud Weight (sg)	1.5
Depth Out (m)	2474	WOB (ton)	1 - 20	Drive System	Geo-Pilot
Meters	119	RPM	100 - 140	Deviation in	9
Hours	19.5	Mud Type	WBM	Deviation out	8.8
ROP (m/hrs)	6.1	TFA (in2)	.994	Max Dogleg	.14
TVD In (m)	2332	TVD Out(m)	2449		
Formation	Rogaland; List, Vale/Maureen, Shetland; Ekofisk				
Lithology	Claystone, Limestone				

Run	Meters	Hours	ROP	
	119	19.5	6.1	
	361	35.5	10.2	
Total	480	54		

DULL GRADE REPORT

Operator TALISMAN
Rig MÆRSK GIANT
Well 15/12-16S
Field VARG

Bit Type FMF3961ZS
Bit Size 12 1/4"
Serial No. 10719632
IADC Code M222

	Inner	Outer	Condition	Location	Bearings	Gauge	Other	POOH
SDBS Dull:	2	1	CT	T	X	I	WT	TD
Rig Dull:	11WTAXINOTD				SBDS Dull Date:		May 4, 2006	
Dull Remarks:								
Recommendation:	REPAIRABLE							
Comments:	Commenced drilling and immediately deflected Geopilot in order to catch up with the delayed turn and build.This was done without problem and the well was on track at 2766m when a hose on the top drive burst and it was necessary to pull backinto the shoe in order to fix it.The hose was replaced and the bit was tripped back to bottom and drilling continued to 2835m where a sample was circulated up forpossible casing pick and the Geologists decided to call TD.							



Depth In (m)	2474	Flow (lpm)	3300 - 3700	Mud Weight (sg)	1.5
Depth Out (m)	2835	WOB (ton)	7 - 13	Drive System	Geo-Pilot
Meters	361	RPM	120 - 150	Deviation in	8.8
Hours	35.5	Mud Type	WBM	Deviation out	27.7
ROP (m/hrs)	10.2	TFA (in2)	.991	Max Dogleg	1.6
TVD In (m)	2449	TVD Out(m)	2786		
Formation	Shetland; Ekofisk, Tor, Hod, Blodoks, Hidra, CromerKnoll; Rodby, Sola, Åsgard, Viking; Draupne				
Lithology	Limestone, Claystone, Sandstone				
Run	Meters	Hours	ROP		
	119	19.5	6.1		
	361	35.5	10.2		
Total	480	54			

DULL GRADE REPORT

Operator TALISMAN
Rig MÆRSK GIANT
Well 15/12-16S
Field VARG

Bit Type FM3755Z
Bit Size 8 1/2"
Serial No. 10716385
IADC Code M422

	Inner	Outer	Condition	Location	Bearings	Gauge	Other	POOH
SDBS Dull:	1	2	WT	S	X	I	CT	TD
Rig Dull:	00WTAXINOTD				SBDS Dull Date:		April 18, 2006	
Dull Remarks:								
Recommendation:	REPAIR							
Comments:	Drilled out shoetrack without problems.The assembly built by approximately 0.3 deg/30m and held direction.							



Depth In (m)	2835	Flow (lpm)	1920 - 2000	Mud Weight (sg)	1.5
Depth Out (m)	2961	WOB (ton)	5 - 8	Drive System	Rotary
Meters	126	RPM	130 - 140	Deviation in	27.7
Hours	8	Mud Type	WBM	Deviation out	28.6
ROP (m/hrs)	15.8	TFA (in2)	.994	Max Dogleg	.23
TVD In (m)	2786	TVD Out(m)	2897		
Formation	Viking; Draupne, Heather, RZ1				
Lithology	Sandstone, Claystone				
Run	Meters	Hours	ROP		
	126	8	15.8		
Total	126	8			

11.5 BHA Record

Customer : Talisman

Well : 15/12-16S

Discussion:

BHA #	Bit #	Motor Run #	Hole Size (in)	MD In (m)	MD Out (m)	TVD In (m)	TVD Out (m)	Inc In (deg)	Inc Out (deg)	Azi In (deg)	Azi Out (deg)	Drlg hrs	Circ hrs
1	1	1	36.000	0	192	126	191	0.0	0.4	0	100	20	9
2	1rr1	2	36.000	192	192	191	191	0.4	0.4	100	100	0	1
3	2	3	17.500	192	207	191	207	0.4	1.0	100	26	2	4
4	2rr1	4	17.500	207	207	207	207	1.0	1.0	26	26	0	2
5	3		17.500	207	207	207	207	1.0	1.0	26	26	0	8
5A	3rr1		17.500	207	215	207	215	1.0	0.8	26	13	1	2
6	4		24.000	215	215	215	215	0.8	0.8	13	13	0	3
7	2rr2	5	17.500	215	1319	215	1310	0.8	10.9	13	64	50	14
8	5		12.250	1319	1365	1310	1355	10.9	11.2	64	61	7	9
9	5rr1		12.250	1365	2355	1355	2332	11.2	9.0	61	55	50	10
10	6		12.250	2355	2474	2332	2449	9.0	8.8	55	58	20	8
11	6rr1		12.250	2474	2835	2449	2786	8.8	27.7	58	73	36	10
12	7		8.500	2835	2961	2786	2897	27.7	28.6	73	73	8	20

Table 1 - BHA Summary

Motor Run #	Manufacturer	Type	Lobe	OD (in)	Gauge (in)	Bend (deg)	Adj	DLS (Ori) (°/30m)	ROP (Ori) (m/hr)	ROP (Rot) (m/hr)
1	SDS	SperryDrill	3/4	11.250		0.00	Y		1	1
2	SDS	SperryDrill	3/4	11.250		0.00	Y			
3	SDS	SperryDrill	6/7	9.625	17.250	1.15	Y		0	8
4	SDS	SperryDrill	6/7	9.625	17.250	1.15	Y			
5	SDS	SperryDrill	6/7	9.625	17.250	1.15	Y		16	25

Table 2 - Motor Run Summary

Bit #	Manufacturer	Style	OD (in)	Gge Len (in)	Nozzles (/32's)	TFA (mm²)	Dull Grades I O D L B G O R	Ftge (m)	Drlg hrs	ROP (m/hr)
1	Security DBS	XTD12DSC	17.500		4x20	791.6	1-2-WT-A -E-I-NO-TD	192	20.01	3
1rr1	Security DBS	XTD12DSC	17.500		4x20	791.6		0	0.00	
2	Security DBS	EBXT02DSL C	17.500		1x18, 2x20, 1x22	795.5	1-1-WT-A -E-I-NO-HP	15	1.97	8
2rr1	Security DBS	EBXT02DSL C	17.500		1x18, 2x20, 1x22	795.5	1-1-WT-A -E-I-NO-HP	0	0.00	
3	Security DBS	EBXT1GSLC	17.500		1x18, 2x20, 1x22	795.5		0	0.00	
3rr1	Security DBS	EBXT1GSLC	17.500		1x18, 2x20, 1x22	795.5	0-0-NO-A -E-I-NO-HP	8	0.50	16
4	Security DBS	XT1DSL C	17.500		4x20	791.6	0-0-NO-A -E-I-NO-TD	0	0.00	
2rr2	Security DBS	EBXT02DSL C	17.500		1x18, 2x20, 1x22	795.5	1-1-WT-A -E-I-NO-TD	1104	49.50	22
5	Security DBS	FMF3643CS C	12.250	18.000	2x14, 4x15	639.4	0-0-NO-A -X-I-NO-DTF	46	7.00	7
5rr1	Security DBS	FMF3643CS C	12.250	18.000	9x12	641.3	4-2-CT-N -X-I-WT-ROP	990	49.50	20
6	Security DBS	FMF3961ZS C	12.250	18.000	9x12	641.3	0-0-NO-A -X-I-NO-DTF	119	19.50	6
6rr1	Security DBS	FMF3961ZS C	12.250	18.000	9x12	641.3	1-1-WT-A -X-I-NO-TD	361	35.50	10
7	Security DBS	FM3755Z	8.500	3.000	4x18	641.3	0-0-WT-A -X-I-NO-TD	126	8.00	16

Table 3 - Bit Run Summary



BHA Report

Customer : Talisman
Well : 15/12-16S
Field : Varg 15/12
Location : Varg South
Rig : Mærsk Giant
Job # : NR-DD-0004058700

BHA# 1

BHA# 1 : Date In : 06-02-2006 MD In (m) : 0 TVD In (m) : 126 Date Out : 08-02-2006 MD Out (m) : 192 TVD Out (m) : 191

BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (mm ²)	Dull Condition
1	17.500	Security DBS	XTD12DSC	755558	4x20	791.6	1-2-WT-A -E-I-NO-TD

MOTOR DATA

Run #	OD (in)	MFR	Model	Serial#	Bend	Nzl (/32's)	Avg Dif (bar)	Cum Circ Hrs
1	11.250	SDS	SperryDrill	1125026	0.00°		2.2	28.79

COMPONENT DATA

Item #	Description	Serial #	OD (in)	ID (in)	Gauge (in)	Weight (kg/m)	Top Con	Length (m)	Bit - Center Blade (m)
1	Roller Cone Insert	755558	17.500	3.000	17.500		P 7-5/8" Reg	0.43	
2	26"-36" 2-Stage Hole Opener	OWS HO3608	36.000	3.000	36.000		P 7-5/8" Reg	3.93	
3	11-1/4" SperryDrill Lobe 3/4 - 3.6 stg	1125026	11.250	5.996		360.86	B 7-5/8" Reg	9.31	
4	Float Sub	OWS FS037	9.438	3.000		318.90	B 7-5/8" Reg	0.79	
5	Welded Blade Stabilizer	74466	9.500	3.000	36.000	323.58	B 7-5/8" Reg	2.66	15.72
6	Anderdrift Tool	ADB983	9.500	3.000		323.58	B 7-5/8" Reg	2.91	
7	1x Drill collar		9.750	3.000		342.74	B 7-5/8" Reg	9.45	
8	1x Drill collar		9.750	3.125		339.69	B 7-5/8" Reg	9.32	
9	1x Drill collar		9.750	3.125		339.69	B 7-5/8" Reg	9.46	
10	1x Drill collar		9.750	3.125		339.69	B 7-5/8" Reg	9.45	
11	Cross Over Sub		9.500	3.000		323.58	B 6-5/8" Reg	0.99	
12	6 x Drill collar		8.000	3.000		219.04	B 6-5/8" Reg	54.84	
13	Cross Over Sub		8.000	2.810		223.43	B 5-1/2" FH	1.10	
14	8 x HWDP to surface		5.500	3.500		71.68	B 5-1/2" FH	76.86	
								191.50	

Parameter	Min	Max	Ave
WOB (kg) :	2000	2000	2000
RPM (rpm) :	45	45	45
Flow (L/min) :	2100	4400	4139
SPP (bar) :	20.0	83.0	66.6

Activity	Hrs
Drilling :	20.01
Reaming :	4.39
Circ-Other :	4.39
Total :	28.79

BHA Weight	(kg)
in Air (Total) :	56982
in Mud (Total) :	49741
in Air (Bel Jars) :	0
in Mud (Bel Jars) :	0

Drill String	OD(in)	Len(m)
DP(S)-FH-21.90#	5.500	0

PERFORMANCE

	In	Out
Inclination (deg)	0.00	0.38
Azimuth (deg)	0.00	100.08

	Distance(m)	ROP (m/hr)	Build (°/30m)	Turn (°/30m)	DLS (°/30m)
Oriented :	17.00	1			
Rotated :	174.50	1			
Total :	191.50	3	0.18	0.00	0.18

COMMENTS

P/U to L/O BHA = 43.00hrs (1530hrs 06-02-06 to 1030hrs 08-02-06)
Drill hours = 17.30hrs
Total Circ hours = 28.80hrs
Footage = 65m

OBJECTIVES:

Spud the well within 1.5m of surface location and drill vertically to a 36" TD of 189m.

RESULTS:

The pre-made up Sperry BHA components were picked up and RIH. The seabed was tagged at 125.5m confirming a water depth of 87m. The ROV provided the bit on seabed location as being 2.1m in a direction of 110deg from planned. This was discussed with Talisman in town and a decision was made to go ahead and spud the well. The Anderdrift tool was not checked prior to spudding as per Company reps instructions.

The Spud was initiated with low flow of 2000 lpm and no surface rotation. Flow was stepped up to 4500 lpm by 133m, WOB ± 2 Tonne, SPP 76Bar, Diff 3.5bar. ROPs were slower than expected at 1-4mph. An Anderdrift reading was taken with the bit at 131.5m resulting in a survey of 1.75deg inc at 113.2m. The remainder of the stand was drilled down without rotation to 142m a single was wiped prior to taking a Anderdrift reading resulting in one pulse equating to an inclination of +2.5deg inc at 124.1m. This was discussed with the Talisman rep and a decision was made to make a connection and continue drilling. At 143m when the 36" stabiliser was below the mudline, surface rotation was started with ± 45 rpm. ROPs were still low at 2-4mph. At ± 144 m boulders were encountered increasing torque and vibration. At the next connection 151.7m the string was picked up and backreamed. Progress was slow when passing the area where boulders were encountered due to high vibration and motor stalling. This was thought to be caused by large pieces of debris falling on top of the hole opener. After the area was cleaned up an attempt was made to check the two surveys taken earlier. The maximum recommended flow of 3000lpm was used however, the tool failed to function properly. After two attempts the flow was cut back to 2000lpm resulting in good tool function providing the following results; 0.75deg at 125.2m and 1deg at 131m. These were within the 1.5deg tolerance and drilling continued. Hi Vis sweeps were pumped every 10m and inclination surveys were taken every single. At stand down depth of 170m after a Hi-Visc sweep the string was backreamed. Again progress was slow as high torque and motor stalling was experienced. The rotary was cut towards the top of the stand to reduce any debris being knocked in by the 36" stabiliser. As the string was being reamed back to bottom weight was taken at 158m. This was found to be 12m of fill and had to be re-drilled. At stand down a double was washed prior to taking a survey. A double was then worked with no flow or rotation prior to making a connection. After the connection drilling continued, boulders were again encountered from 176m to TD resulting in high torque and motor stalling. TD was reached at 191.5m (189m for the 36" hole opener).

At TD 2x Hi Vis sweeps were pumped, the well was circulated clean and displaced to 1.5sg mud. A wiper trip was performed to 136.5m, 10m below the mudline. Whilst running back to bottom 4m of fill was encountered. 2x Hi Vis pills were pumped and the well was displaced to 1.5sg mud again before POOH.

Due to bad weather the Conductor could not be run. Therefore the assembly was racked back in the derrick to standby for a wiper trip prior to running the Conductor when the weather improves.

On surface the Bit was graded 1-2-WT-A-E-I-NO-TD.

The 26" Hole opener section looked good.

The 36" Hole opener section had one cutter that had been skidding.

Anderdrift surveys used:-

125.5m 0.75deg
131.0m 1.00deg
141.6m 1.25deg
150.8m 0.50deg
159.7m 1.25deg
172.2m 1.00deg

RECOMMENDATIONS:

The Anderdrift survey procedures recommend a maximum flow of 3030lpm to operate their tool. However, we found this rate to be too high causing the tool to malfunction. At 2000lpm the tool functioned as expected.

Minimise backreaming/reaming by wiping with no pumps or rotation. This will reduce knocking the wellbore walls causing subsidence.



BHA Report

Customer : Talisman
Well : 15/12-16S
Field : Varg 15/12
Location : Varg South
Rig : Mærsk Giant
Job # : NR-DD-0004058700

BHA# 2

BHA# 2 : Date In : 09-02-2006 MD In (m) : 192 TVD In (m) : 191 Date Out : 10-02-2006 MD Out (m) : 192 TVD Out (m) : 191

BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (mm²)	Dull Condition
1rr1	17.500	Security DBS	XTD12DSC	755558	4x20	791.6	

MOTOR DATA

Run #	OD (in)	MFR	Model	Serial#	Bend	Nzl (/32's)	Avg Dif (bar)	Cum Circ Hrs
2	11.250	SDS	SperryDrill	1125026	0.00°			29.79

COMPONENT DATA

Item #	Description	Serial #	OD (in)	ID (in)	Gauge (in)	Weight (kg/m)	Top Con	Length (m)	Bit - Center Blade (m)
1	Roller Cone Insert	755558	17.500	3.000	17.500		P 7-5/8" Reg	0.43	
2	26"-36" 2-Stage Hole Opener	OWS HO3604	36.000	3.000	36.000		P 7-5/8" Reg	3.85	
3	11-1/4" SperryDrill Lobe 3/4 - 3.6 stg	1125026	11.250	5.996		360.86	B 7-5/8" Reg	9.31	
4	Float Sub	OWS FS037	9.438	3.000		318.90	B 7-5/8" Reg	0.79	
5	Welded Blade Stabilizer	74466	9.500	3.000	36.000	323.58	B 7-5/8" Reg	2.66	15.64
6	Anderdrift Tool	ADB983	9.500	3.000		323.58	B 7-5/8" Reg	2.91	
7	1x Drill collar		9.750	3.000		342.74	B 7-5/8" Reg	9.45	
8	1x Drill collar		9.750	3.125		339.69	B 7-5/8" Reg	9.32	
9	1x Drill collar		9.750	3.125		339.69	B 7-5/8" Reg	9.46	
10	1x Drill collar		9.750	3.125		339.69	B 7-5/8" Reg	9.45	
11	Cross Over Sub		9.500	3.000		323.58	B 6-5/8" Reg	0.99	
12	6 x Drill collar		8.000	3.000		219.04	B 6-5/8" Reg	54.84	
13	Cross Over Sub		8.000	2.810		223.43	B 5-1/2" FH	1.10	
14	8 x HWDP to surface		5.500	3.500		71.68	B 5-1/2" FH	76.86	
								191.42	

Parameter	Min	Max	Ave
WOB (kg) :			
RPM (rpm) :			
Flow (L/min) :			
SPP (bar) :			

Activity	Hrs
Drilling :	0.00
Reaming :	0.00
Circ-Other :	1.00
Total :	1.00

BHA Weight	(kg)
in Air (Total) :	56572
in Mud (Total) :	49383
in Air (Bel Jars) :	0
in Mud (Bel Jars) :	0

Drill String	OD(in)	Len(m)
DP(S)-FH-21.90#	5.500	0

PERFORMANCE

	In	Out
Inclination (deg)	0.38	0.38
Azimuth (deg)	100.08	100.08

Distance(m)	ROP (m/hr)	Build (°/30m)	Turn (°/30m)	DLS (°/30m)
Oriented :				
Rotated :				
Total :				

COMMENTS

P/U to L/O BHA = 6.50hrs (2000hrs 09-02-06 to 0230hrs 10-02-06)
Drill hours = 0.00hrs
Total Circ hours = 1.00hrs
Footage = 0m

OBJECTIVES:

Due to bad weather delaying running the 30" Conductor a clean up trip will be run.

RESULTS:

Prior to picking up the assembly the Hole opener was changed out due to a ceased bearing on one of the cutters. The assembly was run to the seabed at 126.5m, running in continued using the ROV to confirm the string had entered the hole. At 146m up to 8 Tonnes of weight was taken. The string was then washed and reamed in hole with 35 surface RPM and 3000lpm flow to 170m. Before making the connection the stand was worked without pumps or rotation. After the connection an attempt was made to continue running in without pumps, but weight was taken after just a couple of metres. The assembly was therefore washed and reamed to bottom where 1m of fill was seen.

At TD 2 x bottoms up were circulated and the well was displaced to 1.5 sg mud. The string was then pulled out of hole without any problems and the BHA was racked back before rigging up to run the conductor.

On surface the Bit was graded 1-2-WT-A-E-I-NO-TD.
Both the 26" and 36" Hole opener sections looked good.
No Anderdrift surveys were taken.

RECOMMENDATIONS:

None

BHA Schematic

Talisman

15/12-16S

BHA ID #: 3

17½" Kick-Off Assembly#1

BHA Configuration

O.D.	Length	Description
17.5"	0.41m	Roller Cone Insert
9.625"	8.6m	9-5/8" SperryDrill Lobe 6/7 - 5.0 stg
9.5"	2.53m	16.75" Integral Blade Stabilizer
9.5"	1.04m	Cross Over Sub
8"	7.86m	Evader Gyro
8"	2.8m	MWD DM
8"	8.73m	8" MPT w/DGR + EWR + PWD
8"	3.1m	P4M
8"	2.39m	17" Integral Blade Stabilizer
8"	0.87m	Float Sub w/non ported valve.
8"	2.49m	Screen Sub
8"	54.84m	6 x Drill collar
8"	9.69m	Jar
8"	46.87m	5 x Drill collar
8"	8.35m	Intensifier
8"	27.19m	3 x Drill collar
8"	1.1m	Cross Over Sub
5.5"	83.58m	9 x HWDP

BHA Discussion

P/U to L/O BHA = 18.50hrs (1100hrs 12-02-06 to 0530hrs 13-02-06)

Drill hours = 0.88hrs

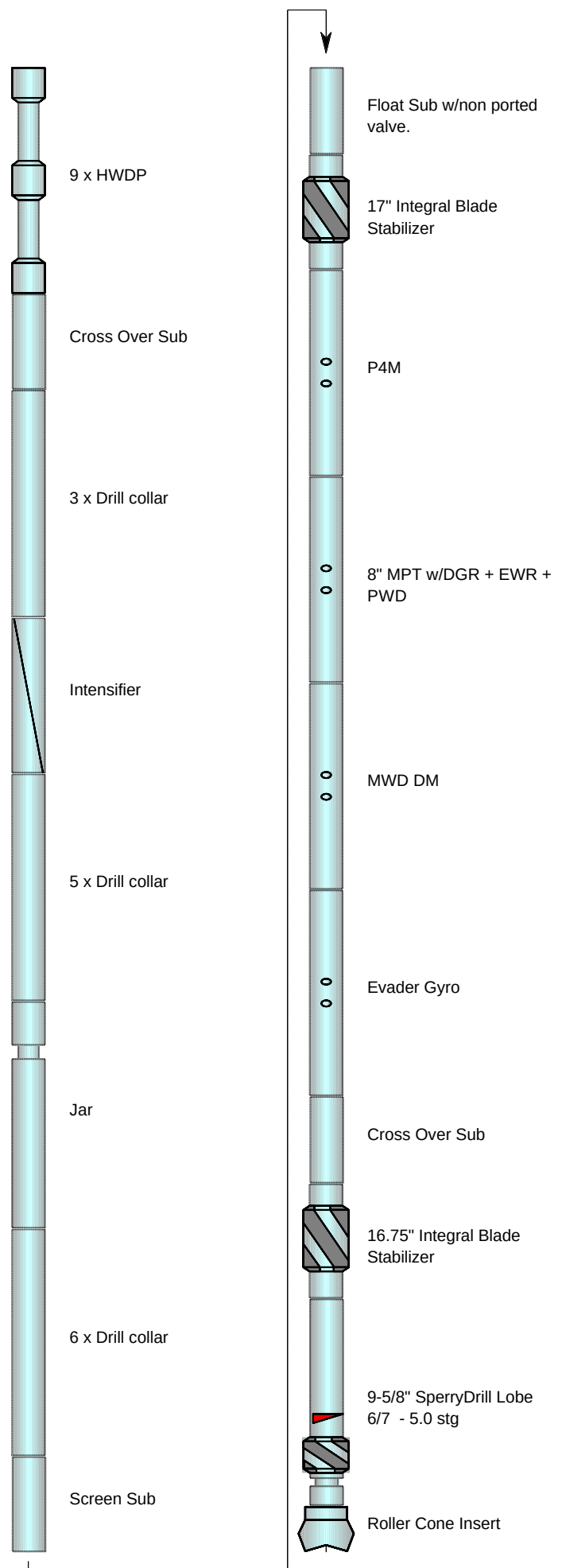
Total Circ hours = 5.59hrs

Footage = 15.5m

Note: Items Pre-Made up: -

1. Bit-Motor-Stab-X/over.

2. P4M-Stab-Float sub-Screen sub.





BHA Report

Customer : Talisman
Well : 15/12-16S
Field : Varg 15/12
Location : Varg South
Rig : Mærsk Giant
Job # : NR-DD-0004058700

BHA# 3

BHA# 3 : Date In :12-02-2006 MD In (m) : 192 TVD In (m) : 191 Date Out 13-02-2006 MD Out (m): 207 TVD Out (m): 207

BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (mm ²)	Dull Condition
2	17.500	Security DBS	EBXT02DSLC	10779090	1x18, 2x20, 1x22	795.5	1-1-WT-A -E-I-NO-HP

MOTOR DATA

Run #	OD (in)	MFR	Model	Serial#	Bend	Nzl (/32's)	Avg Dif (bar)	Cum Circ Hrs
3	9.625	SDS	SperryDrill	963109	1.15°		1.0	5.90

COMPONENT DATA

Item #	Description	Serial #	OD (in)	ID (in)	Gauge (in)	Weight (kg/m)	Top Con	Length (m)	Bit - Center Blade (m)
1	Roller Cone Insert	10779090	17.500	3.000	17.500		P 7-5/8" Reg	0.41	
2	9-5/8" SperryDrill Lobe 6/7 - 5.0 stg	963109	9.625	6.135	17.250	219.03	B 7-5/8" Reg	8.60	1.33
3	16.75" Integral Blade Stabilizer	74598	9.500	2.875	16.750	326.50	B 7-5/8" Reg	2.53	10.19
4	Cross Over Sub	121600	9.500	2.875		326.50	B 6-5/8" Reg	1.04	
5	Evader Gyro		8.000	3.250		212.81	B 6-5/8" Reg	7.86	
6	MWD DM		8.000	3.000		219.04	B 6-5/8" Reg	2.80	
7	8" MPT w/DGR + EWR + PWD		8.000	3.000		219.04	B 6-5/8" Reg	8.73	
8	P4M	2515	8.000	3.000		219.04	B 6-5/8" Reg	3.10	
9	17" Integral Blade Stabilizer	OVS-2553	8.000	2.813	17.000	223.37	B 6-5/8" Reg	2.39	36.15
10	Float Sub w/non ported valve.	DWS-FS-115	8.000	2.813		223.37	B 6-5/8" Reg	0.87	
11	Screen Sub	10704793	8.000	2.813		223.37	B 6-5/8" Reg	2.49	
12	6 x Drill collar		8.000	2.810		223.43	B 6-5/8" Reg	54.84	
13	Jar		8.000	2.813		223.37	B 6-5/8" Reg	9.69	
14	5 x Drill collar		8.000	2.810		223.18	B 6-5/8" Reg	46.87	
15	Intensifier		8.000	2.810		223.43	B 6-5/8" Reg	8.35	
16	3 x Drill collar		8.000	2.810		223.18	B 6-5/8" Reg	27.19	
17	Cross Over Sub		8.000	2.810		223.43	B 5-1/2" FH	1.10	
18	9 x HWDP		5.500	3.375		84.81	B 5-1/2" FH	83.58	
								272.44	

Parameter	Min	Max	Ave
WOB (kg) :	3000	3000	3000
RPM (rpm) :	45	45	45
Flow (L/min) :	3000	3000	3000
SPP (bar) :	78.0	78.0	78.0

Activity	Hrs
Drilling :	1.97
Reaming :	1.47
Circ-Other :	2.46
Total :	5.90

BHA Weight	(kg)
in Air (Total) :	49842
in Mud (Total) :	43508
in Air (Bel Jars) :	21949
in Mud (Bel Jars) :	19160

Drill String	OD(in)	Len(m)
DP(S)-FH-21.90#	5.500	

PERFORMANCE

	In	Out
Inclination (deg)	0.38	0.95
Azimuth (deg)	100.08	25.51

	Distance(m)	ROP (m/hr)	Build (°/30m)	Turn (°/30m)	DLS (°/30m)
Oriented :	0.00	0			
Rotated :	15.50	8			
Total :	15.50	8	1.10	0.00	1.79

COMMENTS

P/U to L/O BHA = 18.50hrs (1100hrs 12-02-06 to 0530hrs 13-02-06)

Drill hours = 0.88hrs

Total Circ hours = 5.59hrs

Footage = 15.5m

Note: Items Pre-Made up: -

1. Bit-Motor-Stab-X/over.

2. P4M-Stab-Float sub-Screen sub.

OBJECTIVES:

To drill out through the shoe track and clean out the rathole to 191.5m. Drilling the 17 ½" hole section will then continue along the proposal. The well will be kicked off at 230m building to 10deg inc along 290deg az Grid. Gyro Data's Evader Gyro WD will provide toolfaces until the Sperry MWD is clear of magnetic interference. A tangent section is then planned from 430m to 660m before dropping back to vertical by 860m. This is for anti-collision purposes displacing the well to the N.W. away from existing well 15/12-12. At 1030m the well will be kicked off again building to 10deg inc along 55deg az Grid. A tangent section is then planned from 1180m to a section TD of 1290m.

RESULTS:

The pre-made up Sperry BHA components were picked up and RIH. Before tagging cement the pumps were brought up and a gyro survey was attempted without success. The MWD had switched modes on the trip in. After an unsuccessful attempt to change modes a decision was made to continue in and tag cement. The cement was tagged at 183m and drilled with 2-3T at 3000lpm and 45 RPM. The shoe was seen at 185.5 m and drilled very slowly. Soft cement was seen after 186m. The string was worked several times through the shoe while drilling the shoetrack. After drilling out the rathole to 191.5m, 2 x 10 cubic metre hi vis pills were pumped.

Drilling formation continued from 191.5m while pumping the second pill out, however serious losses were noted at 192m. At 194m the string was pulled back to 180m in order to monitor the losses which were seen to be running at 60 cubes per hour. At this point the ROV was monitoring the conductor at the seabed and losses were seen coming up the outside of the conductor. It was decided to drill on to 207m in order to allow space for a good cement plug to be put on bottom. While drilling continued there were virtually no returns along the flowline. The short drilling run was also characterised with frequent high vibration which was ameliorated by increasing the WOB and/or reducing the flow.

On surface the Bit was graded 1-1-WT-A-E-I-NO-HP.

RECOMMENDATIONS:

None

BHA Schematic

Talisman

15/12-16S

BHA ID #: 4

17½" Kick-Off Assembly#2

BHA Configuration

O.D.	Length	Description
17.5"	0.41m	Roller Cone Insert
9.625"	8.6m	9-5/8" SperryDrill Lobe 6/7 - 5.0 stg
9.5"	2.53m	16.75" Integral Blade Stabilizer
9.5"	1.04m	Cross Over Sub
8"	7.86m	Evader Gyro
8"	2.8m	MWD DM
8"	8.73m	8" MPT w/DGR + EWR + PWD
8"	3.1m	P4M
8"	2.39m	17" Integral Blade Stabilizer
8"	0.87m	Float Sub w/non ported valve.
8"	2.49m	Screen Sub
8"	54.84m	6 x Drill collar
8"	9.69m	Jar
8"	46.87m	5 x Drill collar
8"	8.35m	Intensifier
8"	27.19m	3 x Drill collar
8"	1.1m	Cross Over Sub
5.5"	83.58m	9 x HWDP

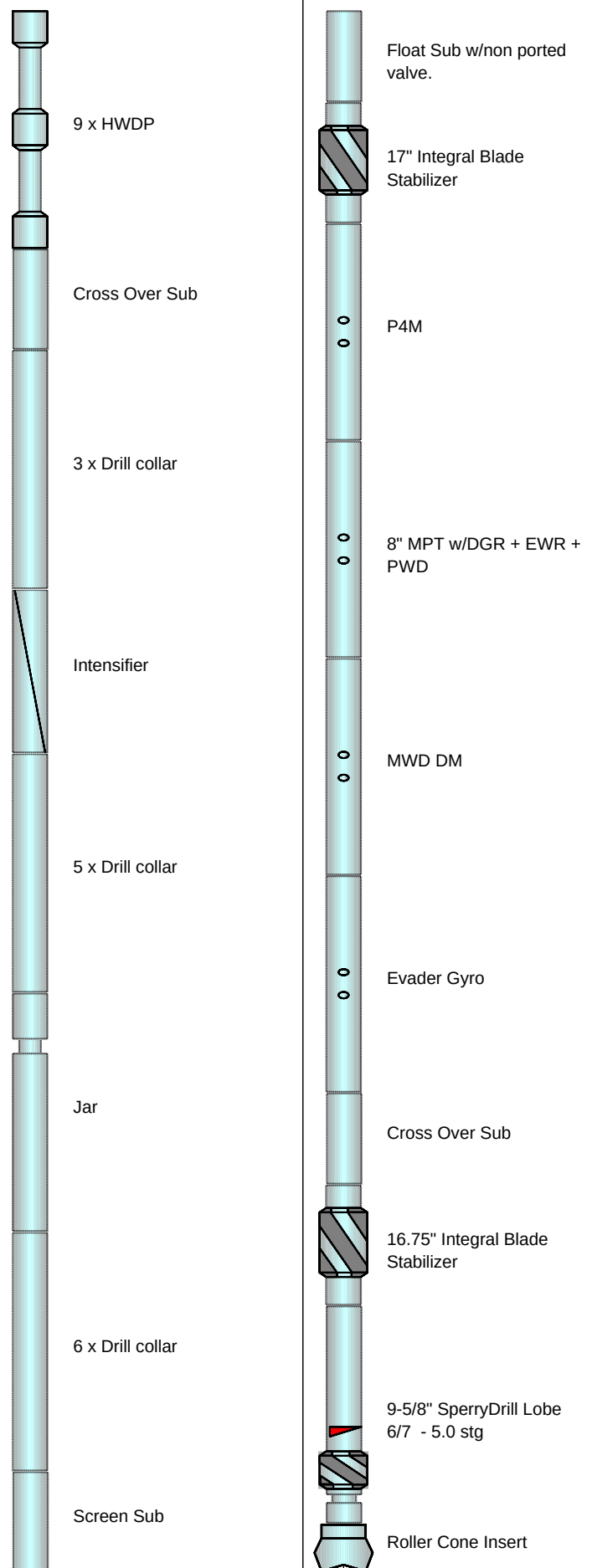
BHA Discussion

P/U to L/O BHA = 7.50hrs (1330hrs 13-02-06 to 2100hrs 13-02-06)

Drill hours = 0.00hrs

Total Circ hours = 1.54hrs

Footage = 0m





BHA Report

Customer : Talisman
Well : 15/12-16S
Field : Varg 15/12
Location : Varg South
Rig : Mærsk Giant
Job # : NR-DD-0004058700

BHA# 4

BHA# 4 : Date In :13-02-2006 MD In (m) : 207 TVD In (m) : 207 Date Out 13-02-2006 MD Out (m): 207 TVD Out (m): 207

BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (mm²)	Dull Condition
2rr1	17.500	Security DBS	EBXT02DSLC	10779090	1x18, 2x20, 1x22	795.5	1-1-WT-A -E-I-NO-HP

MOTOR DATA

Run #	OD (in)	MFR	Model	Serial#	Bend	Nzl (/32's)	Avg Dif (bar)	Cum Circ Hrs
4	9.625	SDS	SperryDrill	963109	1.15°			7.44

COMPONENT DATA

Item #	Description	Serial #	OD (in)	ID (in)	Gauge (in)	Weight (kg/m)	Top Con	Length (m)	Bit - Center Blade (m)
1	Roller Cone Insert	10779090	17.500	3.000	17.500		P 7-5/8" Reg	0.41	
2	9-5/8" SperryDrill Lobe 6/7 - 5.0 stg	963109	9.625	6.135	17.250	219.03	B 7-5/8" Reg	8.60	1.33
3	16.75" Integral Blade Stabilizer	74598	9.500	2.875	16.750	326.50	B 7-5/8" Reg	2.53	10.19
4	Cross Over Sub	121600	9.500	2.875		326.50	B 6-5/8" Reg	1.04	
5	Evader Gyro		8.000	3.250		212.81	B 6-5/8" Reg	7.86	
6	MWD DM		8.000	3.000		219.04	B 6-5/8" Reg	2.80	
7	8" MPT w/DGR + EWR + PWD		8.000	3.000		219.04	B 6-5/8" Reg	8.73	
8	P4M	2515	8.000	3.000		219.04	B 6-5/8" Reg	3.10	
9	17" Integral Blade Stabilizer	OVS-2553	8.000	2.813	17.000	223.37	B 6-5/8" Reg	2.39	36.15
10	Float Sub w/non ported valve.	DWS-FS-115	8.000	2.813		223.37	B 6-5/8" Reg	0.87	
11	Screen Sub	10704793	8.000	2.813		223.37	B 6-5/8" Reg	2.49	
12	6 x Drill collar		8.000	2.810		223.43	B 6-5/8" Reg	54.84	
13	Jar		8.000	2.813		223.37	B 6-5/8" Reg	9.69	
14	5 x Drill collar		8.000	2.810		223.18	B 6-5/8" Reg	46.87	
15	Intensifier		8.000	2.810		223.43	B 6-5/8" Reg	8.35	
16	3 x Drill collar		8.000	2.810		223.18	B 6-5/8" Reg	27.19	
17	Cross Over Sub		8.000	2.810		223.43	B 5-1/2" FH	1.10	
18	9 x HWDP		5.500	3.375		84.81	B 5-1/2" FH	83.58	
								272.44	

Parameter	Min	Max	Ave
WOB (kg) :			
RPM (rpm) :			
Flow (L/min) :			
SPP (bar) :			

Activity	Hrs
Drilling :	0.00
Reaming :	0.00
Circ-Other :	1.54
Total :	1.54

BHA Weight	(kg)
in Air (Total) :	49842
in Mud (Total) :	43508
in Air (Bel Jars) :	21949
in Mud (Bel Jars) :	19160

Drill String	OD(in)	Len(m)
DP(S)-FH-21.90#	5.500	

PERFORMANCE

	In	Out
Inclination (deg)	0.95	0.95
Azimuth (deg)	25.51	25.51

Distance(m)	ROP (m/hr)	Build (°/30m)	Turn (°/30m)	DLS (°/30m)
Oriented :				
Rotated :				
Total :				

COMMENTS

P/U to L/O BHA = 7.50hrs (1330hrs 13-02-06 to 2100hrs 13-02-06)
Drill hours = 0.00hrs
Total Circ hours = 1.54hrs
Footage = 0m

OBJECTIVES:

To run in hole and tag proposed top of cement at $\pm 175\text{m}$. Drill out cement observing for losses to 207m. Continue drilling 3m formation to 210m whilst observing for losses. If no losses continue drilling the 17½" hole section along the proposal. The well will be kicked off at 230m building to 10deg inc along 290deg az Grid. The Gyrodata Evader Gyro WD will provide toolfaces until the Sperry MWD is clear of magnetic interference. A tangent section is then planned from 430m to 660m before dropping back to vertical by 860m. This is for anti-collision purposes displacing the well to the N.W. away from existing well 15/12-12. At 1030m the well will be kicked off again building to 10deg inc along 55deg az Grid. A tangent section is then planned from 1180m to a section TD of 1290m.

RESULTS:

The assembly was run in hole from the derrick to 161m. The riser was filled to gain an indication of losses with volume pumped. Returns were gained after pumping at 1940 lpm. A flow check was made and the level in the riser was observed to drop quickly. Washing down was started with 1000lpm and the cement plug was tagged at 186m, 11m below the theoretical top. One metre of cement was reamed to 187m with 2500lpm. Major losses were being observed. At this point a decision was made to pull out of hole in order to perform a cement squeeze plug.

RECOMMENDATIONS:

None

BHA Schematic

Talisman

15/12-16S

BHA ID #: 5

17½" Kick-Off Assembly#3

BHA Configuration

O.D.	Length	Description
17.5"	0.42m	Roller Cone Steel
9.5"	2.47m	NB Integral Blade Stabilizer w/Float
9.5"	0.99m	Cross Over Sub
8"	82.89m	9 x Drill collar
8.063"	1.11m	Cross Over Sub
5.5"	83.58m	9 x HWDP

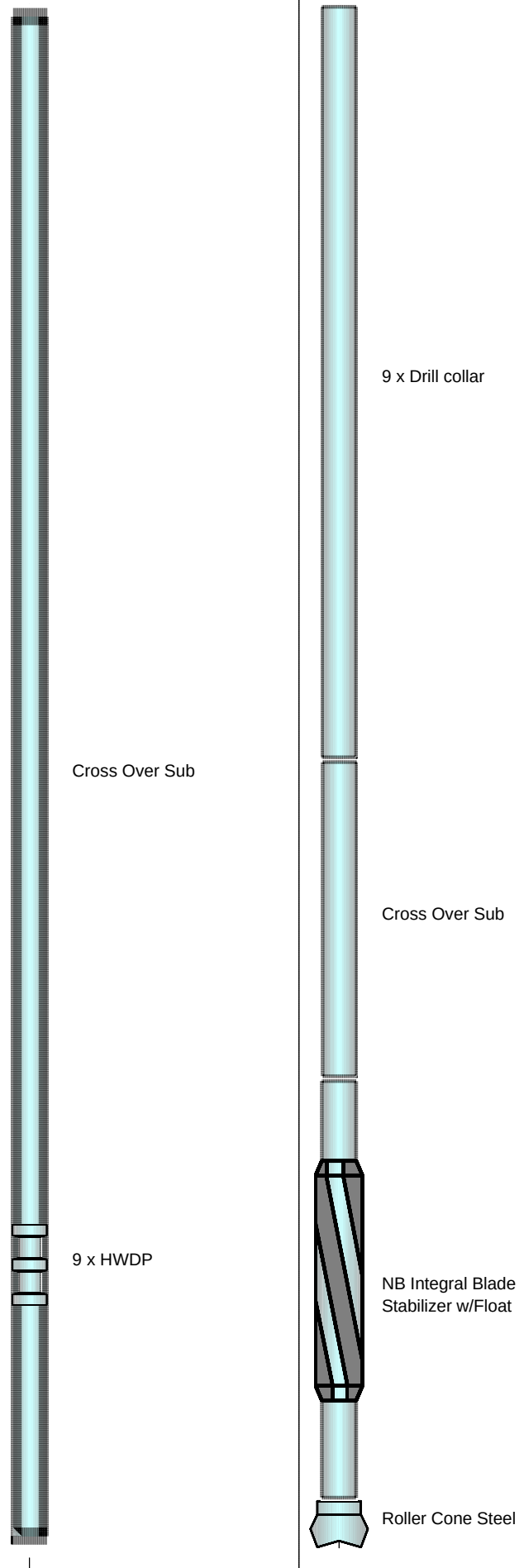
BHA Discussion

P/U to L/O BHA = 11.50hrs (1200hrs 14-02-06 to 2330hrs 14-02-06)

Drill hours = 0.00hrs

Total Circ hours = 5.90hrs

Footage = 0m





BHA Report

Customer : Talisman
Well : 15/12-16S
Field : Varg 15/12
Location : Varg South
Rig : Mærsk Giant
Job # : NR-DD-0004058700

BHA# 5

BHA# 5 : Date In :14-02-2006 MD In (m) : 207 TVD In (m) : 207 Date Out :14-02-2006 MD Out (m): 207 TVD Out (m): 207

BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (mm²)	Dull Condition
3	17.500	Security DBS	EBXT1GSLC	10627777	1x18, 2x20, 1x22	795.5	

MOTOR DATA

Run #	OD (in)	MFR	Model	Serial#	Bend	Nzl (/32's)	Avg Dif (bar)	Cum Circ Hrs

COMPONENT DATA

Item #	Description	Serial #	OD (in)	ID (in)	Gauge (in)	Weight (kg/m)	Top Con	Length (m)	Bit - Center Blade (m)
1	Roller Cone Steel	10627777	17.500	3.000	17.500		P 7-5/8" Reg	0.42	
2	NB Integral Blade Stabilizer w/Float	69258	9.500	3.000	17.500	323.58	B 7-5/8" Reg	2.47	1.58
3	Cross Over Sub	OWSXO620	9.500	3.000		323.58	B 6-5/8" Reg	0.99	
4	9 x Drill collar		8.000	2.810		223.43	B 6-5/8" Reg	82.89	
5	Cross Over Sub	DT22248	8.063	2.813		227.40	B 5-1/2" FH	1.11	
6	9 x HWDP		5.500	3.375		84.81	B 5-1/2" FH	83.58	
								171.46	

Parameter	Min	Max	Ave
WOB (kg) :			
RPM (rpm) :			
Flow (L/min) :			
SPP (bar) :			

Activity	Hrs
Drilling :	0.00
Reaming :	0.00
Circ-Other :	7.50
Total :	7.50

BHA Weight	(kg)
in Air (Total) :	27478
in Mud (Total) :	23986
in Air (Bel Jars) :	0
in Mud (Bel Jars) :	0

Drill String	OD(in)	Len (m)
DP(S)-FH-21.90#	5.500	36

PERFORMANCE

	In	Out
Inclination (deg)	0.95	0.95
Azimuth (deg)	25.51	25.51

Distance(m)	ROP (m/hr)	Build (°/30m)	Turn (°/30m)	DLS (°/30m)
Oriented :				
Rotated :				
Total :				

COMMENTS

P/U to L/O BHA = 11.50hrs (1200hrs 14-02-06 to 2330hrs 14-02-06)
Drill hours = 0.00hrs
Total Circ hours = 5.90hrs
Footage = 0m

OBJECTIVES:

After the cement squeeze plug was completed the riser level was observed and seen to be falling quite quickly indicating heavy static losses. Therefore a milled toothed bit on a simple rotary assembly will be utilised to tag proposed top of cement at $\pm 175\text{m}$. Drill out cement observing for losses to just below the shoe at 186.9m. A near bit stabiliser was used as no bit sub was available.

RESULTS:

The clean up rotary assembly was made up and run in hole to 175m. It was washed down with 500lpm. Hard cement was tagged at 185m and reamed to 188m with 80rpm, 2-3T WOB and 4500lpm. Losses were seen to be running at $\pm 4\text{m}^3/\text{hr}$. Bottoms up was circulated prior to pulling the assembly.

At 89m a change of plan to was made to ream a further 6m of cement to 194m. Talisman Company man was advised that the assembly was not purpose built to drill ahead vertically. However, as long as light weight was employed no problems should be encountered. The bit was washed down from 181m and cement reamed from 188m to 194m with 4500lpm. Losses were in the range of $6\text{m}^3/\text{hr}$. A decision was made to ream a further 4m to 197m. Losses with 4500lpm were $\pm 6\text{m}^3/\text{hr}$, but increased to $\pm 15\text{m}^3/\text{hr}$ by 197m. The flow was reduced to 3000lpm and losses were seen to drop to $\pm 6\text{m}^3/\text{hr}$. A 10m³ LCM pill was spotted on bottom and the string pulled to 165m. Whilst circulating at 165m losses were seen over the shakers due to the screens blinding. The well was then observed on the trip tank with losses of $\pm 5\text{m}^3/\text{hr}$.

A decision was made to ream out the remainder of the cement to 207m and then drill some new hole to observe losses. However, it was decided to pull back to pick up a Jar. At this stage Talisman Company man was advised to also pick up a 17½" string stabiliser above the first 8"DC to stiffen up the BHA to help maintain verticality. The string was then pulled in order to reconfigure the BHA and pick up a jar stand.

The bit was not graded as the assembly was only pulled to the top of the first stand of drill collars.

RECOMMENDATIONS:

A packed or pendulum type rotary assembly would normally be recommended for this application. The assembly utilised for this run was not intended for the final application. A 17½" NB stabiliser was used for a fast turn-around as no Bit sub was available on the rig. The assembly is a build assembly the intended application was to ream cement to $\pm 1\text{m}$ only outside the casing shoe. However, at this depth in this formation over the distance reamed and using light weights, it is highly unlikely that the assembly would deviate too much and therefore the Objectives were achieved.

BHA Schematic

Talisman

15/12-16S

BHA ID #: 5A

17½" Drill Out Assembly

BHA Configuration

O.D.	Length	Description
17.5"	0.42m	Roller Cone Steel
9.5"	2.47m	NB Integral Blade Stabilizer w/Float
9.5"	0.99m	Cross Over Sub
8"	36.6m	4 x Drill collar
8"	9.69m	Jar
8"	36.49m	4 x Drill collar
8.063"	1.11m	Cross Over Sub
5.5"	83.58m	9 x HWDP

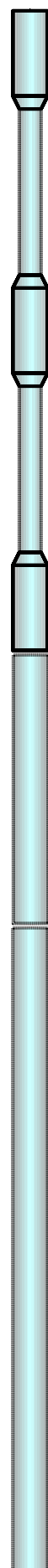
BHA Discussion

P/U to L/O BHA = 4.50hrs (2330hrs 14-02-06 to 0400hrs 15-02-06)

Drill hours = 1.00hrs

Total Circ hours = 3.00hrs

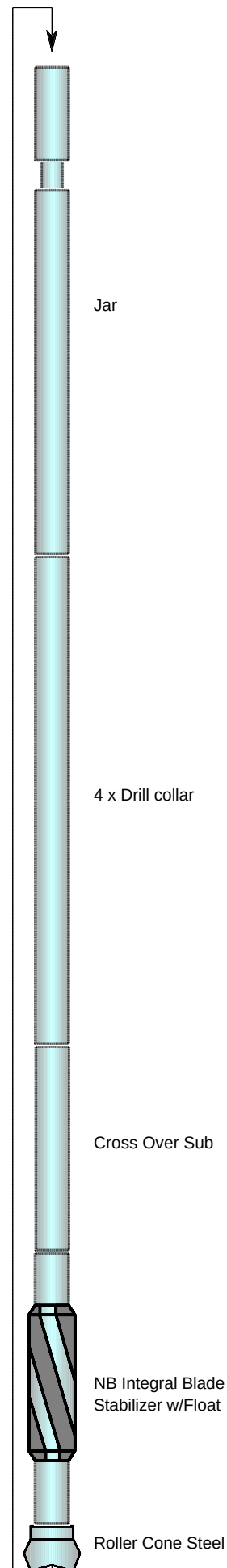
Footage = 8m



9 x HWDP

Cross Over Sub

4 x Drill collar



Jar

4 x Drill collar

Cross Over Sub

NB Integral Blade
Stabilizer w/Float

Roller Cone Steel



BHA Report

Customer : Talisman
Well : 15/12-16S
Field : Varg 15/12
Location : Varg South
Rig : Mærsk Giant
Job # : NR-DD-0004058700

BHA# 5A

BHA# 5A : Date In :14-02-2006 MD In (m) : 207 TVD In (m) : 207 Date Out 15-02-2006 MD Out (m): 215 TVD Out (m): 215

BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (mm²)	Dull Condition
3rr1	17.500	Security DBS	EBXT1GSLC	10627777	1x18, 2x20, 1x22	795.5	0-0-NO-A -E-I-NO-HP

MOTOR DATA

Run #	OD (in)	MFR	Model	Serial#	Bend	Nzl (/32's)	Avg Dif (bar)	Cum Circ Hrs

COMPONENT DATA

Item #	Description	Serial #	OD (in)	ID (in)	Gauge (in)	Weight (kg/m)	Top Con	Length (m)	Bit - Center Blade (m)
1	Roller Cone Steel	10627777	17.500	3.000	17.500		P 7-5/8" Reg	0.42	
2	NB Integral Blade Stabilizer w/Float	69258	9.500	3.000	17.500	323.58	B 7-5/8" Reg	2.47	1.58
3	Cross Over Sub	OWSXO620	9.500	3.000		323.58	B 6-5/8" Reg	0.99	
4	4 x Drill collar		8.000	2.810		223.43	B 6-5/8" Reg	36.60	
5	Jar	80660	8.000	2.813		223.37	B 6-5/8" Reg	9.69	
6	4 x Drill collar		8.000	2.810		223.18	B 6-5/8" Reg	36.49	
7	Cross Over Sub	DT22248	8.063	2.813		227.40	B 5-1/2" FH	1.11	
8	9 x HWDP		5.500	3.375		84.81	B 5-1/2" FH	83.58	
								171.35	

Parameter	Min	Max	Ave
WOB (kg) :	2000	2000	2000
RPM (rpm) :	80	80	80
Flow (L/min) :	4500	4500	4500
SPP (bar) :	80.0	80.0	80.0

Activity	Hrs
Drilling :	0.50
Reaming :	0.00
Circ-Other :	2.00
Total :	2.50

BHA Weight	(kg)
in Air (Total) :	27443
in Mud (Total) :	23956
in Air (Bel Jars) :	9794
in Mud (Bel Jars) :	8550

Drill String	OD(in)	Len(m)
DP(S)-FH-21.90#	5.500	44

PERFORMANCE

	In	Out
Inclination (deg)	0.95	0.84
Azimuth (deg)	25.51	13.15

	Distance(m)	ROP (m/hr)	Build (°/30m)	Turn (°/30m)	DLS (°/30m)
Oriented :	0.00	0			
Rotated :	8.00	16			
Total :	8.00	16	-0.42	0.00	0.83

COMMENTS

P/U to L/O BHA = 4.50hrs (2330hrs 14-02-06 to 0400hrs 15-02-06)
Drill hours = 1.00hrs
Total Circ hours = 3.00hrs
Footage = 8m

OBJECTIVES:

To pull back with BHA#5 and incorporated a set of jars. The objective will be to tag cement at 197m, ream out cement to 207m and drill new formation vertically to 215m. Losses will be monitored during operations. The assembly will then be pulled for a third cement plug.

RESULTS:

As with BHA #5 this assembly is not recommended for this application. However, it was discussed with Talisman and it was decided that with light WOB at this inclination and over the distance intended to drill the assembly should not deviate too much.

The assembly was pulled back and a set of Jars was incorporated. The assembly was then run back in hole to 183m where circulation was broken. Cement was tagged at 197m with 3000lpm. Flow was increased to 4500lpm and the cement was reamed out with 1-2T WOB and 80rpm to 207m. Samples were taken showing 95% cement indicating the old hole was followed. Drilling 8 metres of formation continued from 207-215m at 15m/hr again with a low WOB. Losses while drilling at 4500lpm were $\pm 12\text{m}^3/\text{hr}$. The hole was circulated clean prior to tripping to run a cement stinger.

The bit was graded 0-0-NO-A-E-I-NO-HP

RECOMMENDATIONS:

A packed or pendulum type rotary assembly would normally be recommended for this application. The assembly utilised for this run was not intended for the final application. A 17½" NB stabiliser was used for a fast turn-around as no Bit sub was available on the rig. The assembly is a build assembly the intended application was to ream cement to $\pm 1\text{m}$ only outside the casing shoe. However, at this depth in this formation over the distance drilled using light weights, it is highly unlikely that the assembly would deviate too much and therefore the Objectives were achieved.

BHA Schematic

Talisman

15/12-16S

BHA ID #: 6

24" Clean-Out Assembly

BHA Configuration

O.D.	Length	Description
17.5"	0.56m	Roller Cone Steel
9.5"	2.47m	NB Integral Blade Stabilizer w/Float
9.5"	0.99m	Cross Over Sub
8"	82.89m	9 x Drill collar
8.063"	1.11m	Cross Over Sub
5.5"	83.58m	9 x HWDP

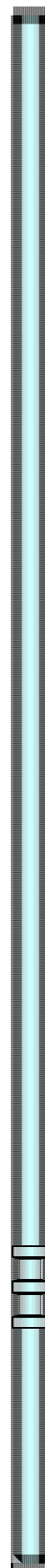
BHA Discussion

P/U to L/O BHA = 5.50hrs (0800hrs 15-02-06 to 1330hrs 15-02-06)

Drill hours = 0.00hrs

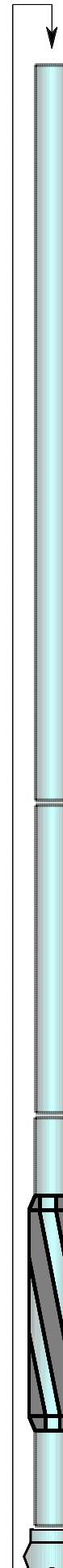
Total Circ hours = 2.00hrs

Footage = 0m



Cross Over Sub

9 x HWDP



9 x Drill collar

Cross Over Sub

NB Integral Blade
Stabilizer w/Float

Roller Cone Steel



BHA Report

Customer : Talisman
Well : 15/12-16S
Field : Varg 15/12
Location : Varg South
Rig : Mærsk Giant
Job # : NR-DD-0004058700

BHA# 6

BHA# 6 : Date In :15-02-2006 MD In (m) : 215 TVD In (m) : 215 Date Out :15-02-2006 MD Out (m): 215 TVD Out (m): 215

BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (mm²)	Dull Condition
4	17.500	Security DBS	XT1DSLC	10730375	4x20	791.6	0-0-NO-A -E-I-NO-TD

MOTOR DATA

Run #	OD (in)	MFR	Model	Serial#	Bend	Nzl (/32's)	Avg Dif (bar)	Cum Circ Hrs

COMPONENT DATA

Item #	Description	Serial #	OD (in)	ID (in)	Gauge (in)	Weight (kg/m)	Top Con	Length (m)	Bit - Center Blade (m)
1	Roller Cone Steel	10730375	17.500	3.000	24.000		P 7-5/8" Reg	0.56	
2	NB Integral Blade Stabilizer w/Float	69258	9.500	3.000	17.500	323.58	B 7-5/8" Reg	2.47	1.72
3	Cross Over Sub	OWSXO620	9.500	3.000		323.58	B 6-5/8" Reg	0.99	
4	9 x Drill collar		8.000	2.810		223.43	B 6-5/8" Reg	82.89	
5	Cross Over Sub	DT22248	8.063	2.813		227.40	B 5-1/2" FH	1.11	
6	9 x HWDP		5.500	3.375		84.81	B 5-1/2" FH	83.58	
								171.60	

Parameter	Min	Max	Ave
WOB (kg) :			
RPM (rpm) :			
Flow (L/min) :			
SPP (bar) :			

Activity	Hrs
Drilling :	0.00
Reaming :	0.00
Circ-Other :	2.50
Total :	2.50

BHA Weight	(kg)
in Air (Total) :	27643
in Mud (Total) :	24131
in Air (Bel Jars) :	0
in Mud (Bel Jars) :	0

Drill String	OD(in)	Len(m)
DP(S)-FH-21.90#	5.500	43

PERFORMANCE

	In	Out
Inclination (deg)	0.84	0.84
Azimuth (deg)	13.15	13.15

Distance(m)	ROP (m/hr)	Build (°/30m)	Turn (°/30m)	DLS (°/30m)
Oriented :				
Rotated :				
Total :				

COMMENTS

P/U to L/O BHA = 5.50hrs (0800hrs 15-02-06 to 1330hrs 15-02-06)
Drill hours = 0.00hrs
Total Circ hours = 2.00hrs
Footage = 0m

OBJECTIVES:

To run in hole with 24" Milled toothed bit on basic rotary assembly. Ream out cement in 30" Conductor to 20" Crossover observing for losses.

RESULTS:

The assembly was made up and run in hole. At 142m circulation was broken with 500lpm and the string was washed down to tag cement. At 170m no hard cement had been tagged. The hole was circulated, green cement returns were dumped at the shakers. The string was then washed down to the 20" Crossover at 181m with 4000lpm. No hard cement was tagged and no losses were observed.

The assembly was pulled to run the drilling assembly.

RECOMMENDATIONS:

None

BHA Schematic

Talisman

15/12-16S

BHA ID #: 7

17½" Kick-Off Assembly#4

BHA Configuration

O.D.	Length	Description
17.5"	0.41m	Roller Cone Insert
9.625"	8.6m	9-5/8" SperryDrill Lobe 6/7 - 5.0 stg
9.5"	2.53m	16.75" Integral Blade Stabilizer
9.5"	1.04m	Cross Over Sub
8"	7.86m	Evader Gyro
8"	2.8m	MWD DM
8"	8.73m	8" MPT w/DGR + EWR + PWD
8"	3.1m	P4M
8"	2.39m	17" Integral Blade Stabilizer
8"	0.87m	Float Sub w/non ported valve.
8"	2.49m	Screen Sub
8"	54.84m	6 x Drill collar
8"	9.69m	Jar
8"	46.87m	5 x Drill collar
8"	8.35m	Intensifier
8"	27.19m	3 x Drill collar
8"	1.1m	Cross Over Sub
5.5"	83.58m	9 x HWDP

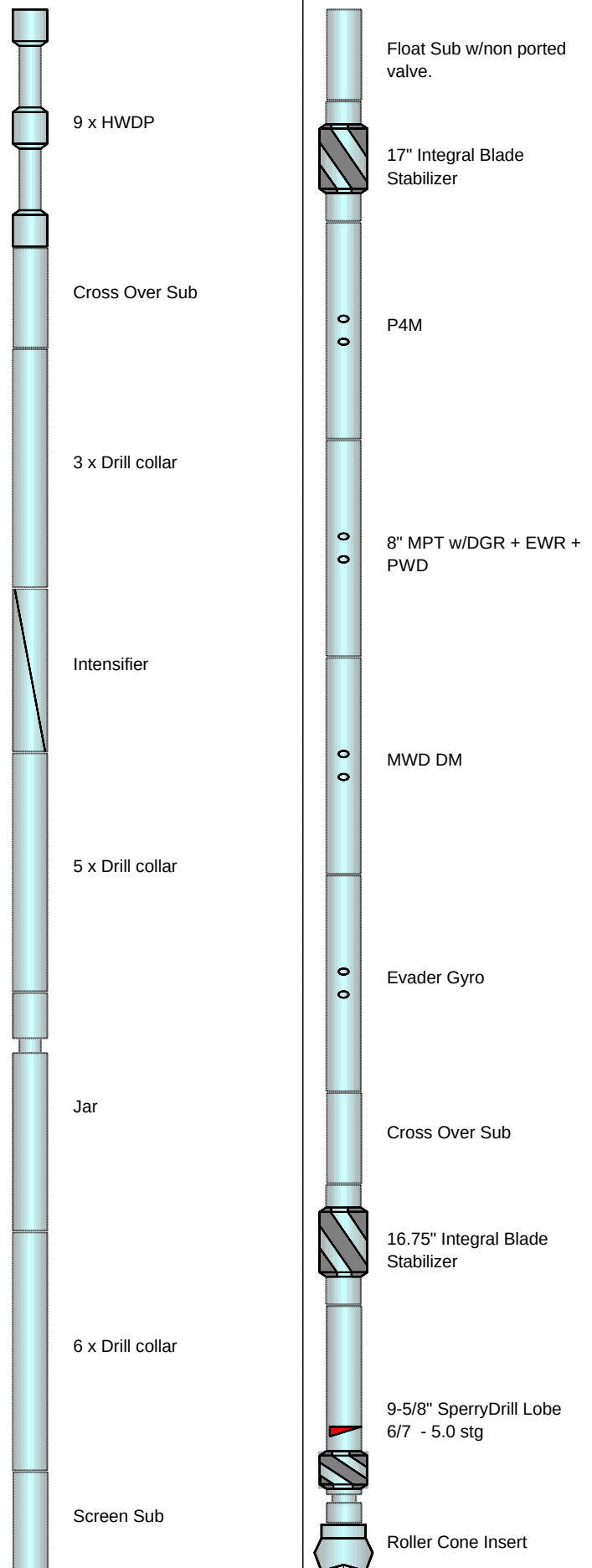
BHA Discussion

P/U to L/O BHA = 78.00hrs (1400hrs 15-02-06 to 2000hrs 18-02-06)

Drill hours = 27.79hrs

Total Circ hours = 58.45hrs

Footage = 1104m





BHA Report

Customer : Talisman
Well : 15/12-16S
Field : Varg 15/12
Location : Varg South
Rig : Mærsk Giant
Job # : NR-DD-0004058700

BHA# 7

BHA# 7 : Date In :15-02-2006 MD In (m) : 215 TVD In (m) : 215 Date Out 18-02-2006 MD Out (m): 1319 TVD Out (m): 1310

BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (mm²)	Dull Condition
2rr2	17.500	Security DBS	EBXT02DSLC	10779090	1x18, 2x20, 1x22	795.5	1-1-WT-A -E-I-NO-TD

MOTOR DATA

Run #	OD (in)	MFR	Model	Serial#	Bend	Nzl (/32's)	Avg Dif (bar)	Cum Circ Hrs
5	9.625	SDS	SperryDrill	963109	1.15°		7.4	70.94

COMPONENT DATA

Item #	Description	Serial #	OD (in)	ID (in)	Gauge (in)	Weight (kg/m)	Top Con	Length (m)	Bit - Center Blade (m)
1	Roller Cone Insert	10779090	17.500	3.000	17.500		P 7-5/8" Reg	0.41	
2	9-5/8" SperryDrill Lobe 6/7 - 5.0 stg	963109	9.625	6.135	17.250	219.03	B 7-5/8" Reg	8.60	1.33
3	16.75" Integral Blade Stabilizer	74598	9.500	2.875	16.750	326.50	B 7-5/8" Reg	2.53	10.19
4	Cross Over Sub	121600	9.500	2.875		326.50	B 6-5/8" Reg	1.04	
5	Evader Gyro		8.000	3.250		212.81	B 6-5/8" Reg	7.86	
6	MWD DM		8.000	3.000		219.04	B 6-5/8" Reg	2.80	
7	8" MPT w/DGR + EWR + PWD		8.000	3.000		219.04	B 6-5/8" Reg	8.73	
8	P4M	2515	8.000	3.000		219.04	B 6-5/8" Reg	3.10	
9	17" Integral Blade Stabilizer	OVS-2553	8.000	2.813	17.000	223.37	B 6-5/8" Reg	2.39	36.15
10	Float Sub w/non ported valve.	DWS-FS-115	8.000	2.813		223.37	B 6-5/8" Reg	0.87	
11	Screen Sub	10704793	8.000	2.813		223.37	B 6-5/8" Reg	2.49	
12	6 x Drill collar		8.000	2.810		223.43	B 6-5/8" Reg	54.84	
13	Jar		8.000	2.813		223.37	B 6-5/8" Reg	9.69	
14	5 x Drill collar		8.000	2.810		223.18	B 6-5/8" Reg	46.87	
15	Intensifier		8.000	2.810		223.43	B 6-5/8" Reg	8.35	
16	3 x Drill collar		8.000	2.810		223.18	B 6-5/8" Reg	27.19	
17	Cross Over Sub		8.000	2.810		223.43	B 5-1/2" FH	1.10	
18	9 x HWDP		5.500	3.375		84.81	B 5-1/2" FH	83.58	
								272.44	

Parameter	Min	Max	Ave
WOB (kg) :	2000	20000	8965
RPM (rpm) :	40	100	75
Flow (L/min) :	3200	4500	4191
SPP (bar) :	80.0	203.0	173.5

Activity	Hrs
Drilling :	49.50
Reaming :	0.00
Circ-Other :	14.00
Total :	63.50

BHA Weight	(kg)
in Air (Total) :	49842
in Mud (Total) :	43065
in Air (Bel Jars) :	21949
in Mud (Bel Jars) :	18965

Drill String	OD(in)	Len(m)
DP(S)-FH-21.90#	5.500	1047

PERFORMANCE

	In	Out
Inclination (deg)	0.84	10.87
Azimuth (deg)	13.15	63.86

	Distance(m)	ROP (m/hr)	Build (°/30m)	Turn (°/30m)	DLS (°/30m)
Oriented :	308.00	16			
Rotated :	796.00	25			
Total :	1104.00	22	0.27	0.00	0.28

COMMENTS

P/U to L/O BHA = 78.00hrs (1400hrs 15-02-06 to 2000hrs 18-02-06)
Drill hours = 27.79hrs
Total Circ hours = 58.45hrs
Footage = 1104m

OBJECTIVES:

To run in hole with the drilling assembly and tag cement at $\pm 181\text{m}$. Ream/drill out cement through the shoe track and on to TD at 215m. Drilling the 17 1/2" hole section will then continue along the proposal. The well will be kicked off at 230m building to 10deg inc along 290deg az Grid. Gyro Data's Evader Gyro MWD will provide toolfaces until the Sperry MWD is clear of magnetic interference. A tangent section is then planned from 430m to 660m before dropping back to vertical by 860m. This is for anti-collision purposes displacing the well to the N.W. away from existing well 15/12-12. At 1030m the well will be kicked off again building to 10deg inc along 55deg az Grid. A tangent section is then planned from 1180m to a section TD of $\pm 1290\text{m}$.

RESULTS:

The assembly was made up and run in hole. Hard cement was tagged at 181m drilling/reaming cement continued to 215m. MWD/Evader tools were tested whilst reaming cement. Drilling formation commenced at 215m.

Formation: Nordland (Claystone) from Seabed at 126.5m MD.

Parameters: -

WOB: 2-15T. RPM: (surf) 40-100. TQ: 2-8k ftlbs. Flow: 3200-4400lpm. SPP: 98-204bar. Diff: 10bar.

ROP:- Rotary: 30-70m/hr. Oriented: 25-70m/hr

Performance:- Oriented: $\pm 5\text{deg}/30\text{m}$. Rotary:- Build: $+0.04\text{deg}/30\text{m}$. Walk: $+0.6\text{deg}/30\text{m}$.

The Kick-off was initiated at 220m MD utilising the Evader Gyro MWD. No problems were encountered sliding or maintaining a steady toolface. ROPs were very fast at 70-80m/hr with 1-2T WOB. The well was built up to 2.2deg inc along the proposal and was diverging from well 15/12-12. However, build rates were not being achieved with high flow and the well was falling behind on section. Therefore, flow was cut back to 3200lpm in an attempt to gain weight on bit to increase the build rate. This was only necessary for one 18m section after which the formation firmed up. At 387m bit depth the pumps were cycled to change MWD modes from the Evader gyro to Sperry MWD. Drilling continued along the proposal building to $\pm 11\text{deg}$ inc. Maximum dog-leg produced was $2.16\text{deg}/30\text{m}$, with ROPs ranging between 40-70m/hr.

At 496m the tangent section was reached. The assembly performed well drilling all of this section in rotary to 657m MD. Over this section a very slight build of $+0.04\text{deg}/30\text{m}$ was seen with a right walk of $0.6\text{deg}/30\text{m}$. ROPs remained good at 50-70m/hr with 5-15T WOB and flow was maintained at 4400lpm.

From 657m the drop off section was started. Using the same parameters 12m slides per stand would produce a $\pm 1.5\text{deg}$ DLS. Maximum dogleg was $2.0\text{deg}/30\text{m}$ and ROPs ranged between 20-60m/hr.

At 830m the MWD had switched to magnetic steering indicating low angle. A final 13m slide was made pointing the well towards the second kick-off point. Drilling in rotary continued from 843m. ROP was held back to 70m/hr with 4400lpm and 5-20T WOB. However, when flow was reduced to 3400lpm due to pump failure the ROP was limited to 40m/hr.

The final build section was started at 1032m. Sliding $\pm 50\%$ provided $\pm 2.5\text{deg}$ DLSs as expected with $\pm 10\text{T}$ WOB and a flow of 4400lpm. ROPs were 40-60m/hr. However, at $\pm 1091\text{m}$ MD the ROP increased to 250m/hr with 1T WOB. The string was picked up and reoriented the flow was then cut back to 3500lpm before running back to bottom. The soft/fast section lasted $\pm 5\text{m}$ and the formation hereafter was found to be more interbedded. This made it difficult at times to maintain a steady toolface especially at this low angle. However, the required build rates were achieved, but unfortunately the azimuth did not come around as much as planned prior to reaching the Utsira formation.

Formation: Utsira (Sandstone) from 1196m MD.

Parameters: -

WOB: 8-15T. RPM: (surf) 80. TQ: 5-8k ftlbs. Flow: 4400lpm. SPP: 192-204bar. Diff: 10bar.

ROP:- Rotary: 30-70m/hr. Oriented: N/A.

Performance:- Oriented: N/A. Rotary:- Build: $-0.03\text{deg}/30\text{m}$. Walk: $+1.6\text{deg}/30\text{m}$.

The Utsira formation came in ± 6 deeper than prognosed. This formation is a recognised problematic zone. It was decided in the planning stages to line the well up prior to reaching the Utsira and to rotary drill only to section TD in an attempt to minimise any hazards. ROP was controlled at 40-50m/hr in order to achieve good quality logs. A drop in inclination was expected and planned for, but did not occur. However, a very strong right walk tendency was experienced at $1.6\text{deg}/30\text{m}$ pushing the azimuth 10deg right of proposed trajectory. We had decided to rotate through this section as above and therefore no attempts were made to correct the azimuth. A Geopilot is planned for the next section where a simple 2deg dogleg over 30m will bring the azimuth back on line at this low inclination. No hole problems were encountered.

Formation: Hordaland (Mudstone) from 1264m MD

Parameters: -

WOB: 15-20T. RPM: (surf) 80. TQ: 5-9k ftlbs. Flow: 4400lpm. SPP: 192-204bar. Diff: 10bar.

ROP:- Rotary: 38m/hr. Oriented: N/A.

Performance:- Oriented: N/A. Rotary:- Build: $-0.01\text{deg}/30\text{m}$. Walk: $+0.8\text{deg}/30\text{m}$.

Rotary drilling continued through the Hordaland formation. This formation firmed up and required more weight as above to maintain ROP. Section TD was called at 1319m MD. No hole problems were encountered.

RECOMMENDATIONS:

The assembly performed well achieving its objectives and should be considered for similar applications.

BHA Schematic

Talisman

15/12-16S

BHA ID #: 8

12¼" GeoPilot#1

BHA Configuration

O.D.	Length	Description
12.25"	0.62m	PDC
9.625"	6.62m	9600 GeoPilot
8"	2.81m	Geo-Pilot Flex
8"	10.03m	8" HCIM DGR EWR PWD
8"	3.09m	P4M
8"	2.43m	12 1/8" Integral Blade Stabilizer
8"	1.09m	Non-Mag Float Sub w/non ported valve.
8"	2m	Non-Mag Screen Sub
8"	18.22m	2 x Drill collar
8"	9.69m	Jar
8"	46.87m	5 x Drill collar
8"	8.35m	Intensifier
8"	27.19m	3 x Drill collar
8"	1.1m	Cross Over Sub
5.5"	83.58m	9 x HWDP

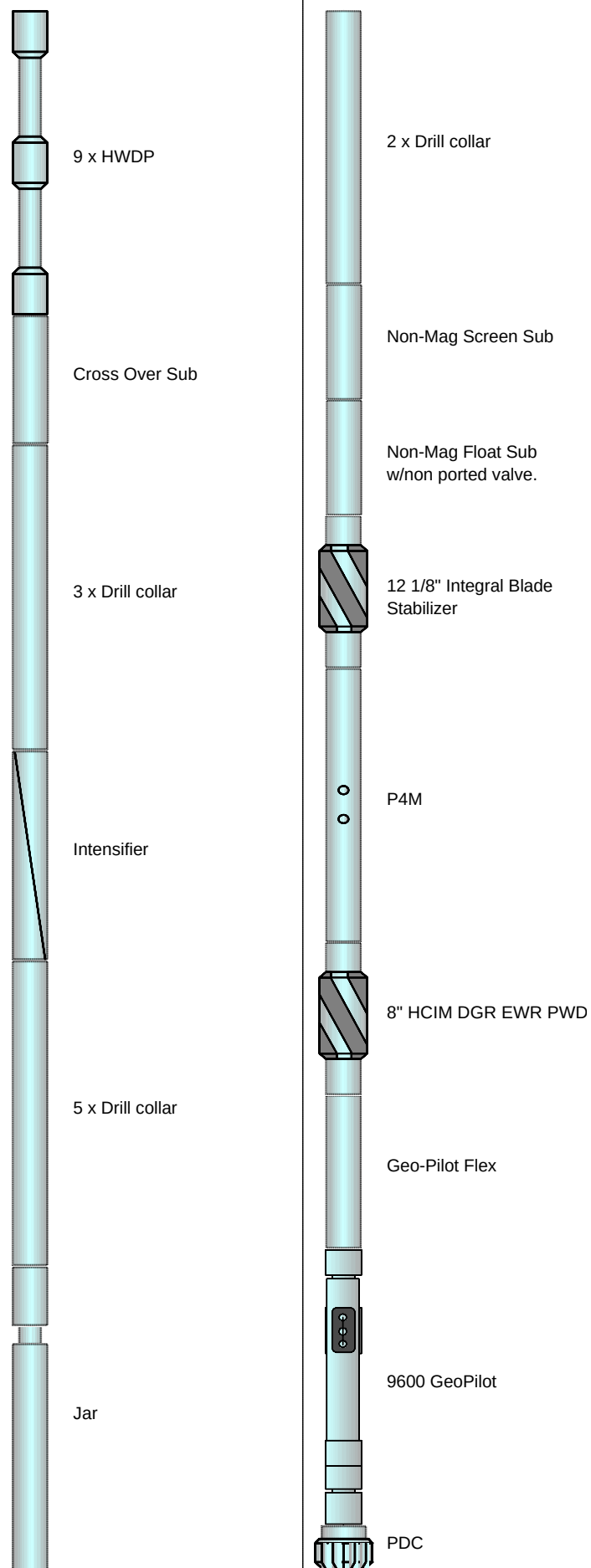
BHA Discussion

P/U to L/O BHA = 26.5hrs (14:30 25-02-06 to 17:00 26-02-06)

Drill hours = 7.0hrs

Total Circ hours = 16.0hrs

Footage = 46m





BHA Report

Customer : Talisman
Well : 15/12-16S
Field : Varg 15/12
Location : Varg South
Rig : Mærsk Giant
Job # : NR-DD-0004058700

BHA# 8

BHA# 8 : Date In : 25-02-2006 MD In (m) : 1319 TVD In (m) : 1310 Date Out : 26-02-2006 MD Out (m) : 1365 TVD Out (m) : 1355

BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (mm ²)	Dull Condition
5	12.250	Security DBS	FMF3643CSC	10699019	2x14, 4x15	639.4	0-0-NO-A -X-I-NO-DTF

MOTOR DATA

Run #	OD (in)	MFR	Model	Serial#	Bend	Nzl (/32's)	Avg Dif (bar)	Cum Circ Hrs
1								

COMPONENT DATA

Item #	Description	Serial #	OD (in)	ID (in)	Gauge (in)	Weight (kg/m)	Top Con	Length (m)	Bit - Center Blade (m)
1	PDC	10699019	12.250	3.000	12.250	561.78	B 6-5/8" Reg	0.62	
2	9600 GeoPilot	037	9.625	2.360	12.188	346.76	B 6-5/8" Reg	6.62	
3	Geo-Pilot Flex		8.000	3.000		223.18	B 6-5/8" Reg	2.81	
4	8" HCIM DGR EWR PWD		8.000	2.250	12.250	234.72	B 6-5/8" Reg	10.03	17.80
5	P4M		8.000	2.250		234.72	B 6-5/8" Reg	3.09	
6	12 1/8" Integral Blade Stabilizer	OWS-STAB-1158	8.000	3.000	12.125	219.04	B 6-5/8" Reg	2.43	24.25
7	Non-Mag Float Sub w/non ported valve.	DWS-FS-70372-16	8.000	3.000		219.04	B 6-5/8" Reg	1.09	
8	Non-Mag Screen Sub	174912	8.000	4.000		191.16	B 6-5/8" Reg	2.00	
9	2 x Drill collar		8.000	2.810		223.43	B 6-5/8" Reg	18.22	
10	Jar		8.000	2.813		223.37	B 6-5/8" Reg	9.69	
11	5 x Drill collar		8.000	2.810		223.18	B 6-5/8" Reg	46.87	
12	Intensifier		8.000	2.810		223.43	B 6-5/8" Reg	8.35	
13	3 x Drill collar		8.000	2.810		223.18	B 6-5/8" Reg	27.19	
14	Cross Over Sub		8.000	2.810		223.43	B 5-1/2" FH	1.10	
15	9 x HWDP		5.500	3.375		84.81	B 5-1/2" FH	83.58	
								223.69	

Parameter	Min	Max	Ave
WOB (kg) :	3000	8000	5978
RPM (rpm) :	80	120	116
Flow (L/min) :	3200	3600	3348
SPP (bar) :	143.0	231.0	202.1

Activity	Hrs
Drilling :	7.00
Reaming :	0.50
Circ-Other :	8.50
Total :	16.00

BHA Weight	(kg)
in Air (Total) :	39467
in Mud (Total) :	33449
in Air (Bel Jars) :	11575
in Mud (Bel Jars) :	9810

Drill String	OD(in)	Len(m)

PERFORMANCE

	In	Out
Inclination (deg)	10.87	11.21
Azimuth (deg)	63.86	60.59

	Distance(m)	ROP (m/hr)	Build (°/30m)	Turn (°/30m)	DLS (°/30m)
Oriented :	17.00	8			
Rotated :	29.00	6			
Total :	46.00	7	0.22	-2.14	0.46

COMMENTS

P/U to L/O BHA = 26.5hrs (14:30 25-02-06 to 17:00 26-02-06)
Drill hours = 7.0hrs
Total Circ hours = 16.0hrs
Footage = 46m

OBJECTIVES:

Drill out cement and shoetrack, clean out rathole and drill 3m of new formation before performing Leak off test.
Displace well to 1.55 WBM using prearranged programme with semi weighted spacers and controlled pump rates.
Continue drilling 12 ¼" hole to below BCU following proposal maintaining 10 degrees and 55 azimuth to 2420m and then building to 26 degrees and turning to an azimuth of 78 to line up on target for rotary assembly in the 8 ½" section

RESULTS:

Washed down and tagged at 1276m., before drilling float collar and cement. Drilled shoe and cleaned rathole and drilled 3m formation prior to performing LOT

Carried out displacement to 1.55 SG mud according to the agreed procedure with 2 semi weighted spacers

Set the GeoPilot to zero deflection and drilled 15 mts of hole to get the MWD assembly clear of the shoe. Set the GeoPilot to 30% deflection at 60 left to initiate a soft left turn. The GeoPilot held the deflection for 5 mts then started to go erratic, finally locking at 85% deflection at 30 right. Stopped drilling at 1365 mts and pulled off btm.

Contacted engineers in town, discussed the situation and examined the data. Attempted several times to get a response from the GeoPilot tool without any success. Decision made to POOH and L/D tool.

BHA Schematic

Talisman

15/12-16S

BHA ID #: 9

12¼" GeoPilot#2

BHA Configuration

O.D.	Length	Description
12.25"	0.62m	PDC
9.625"	6.62m	9600 GeoPilot
8"	2.76m	Geo-Pilot Flex
8"	10.03m	8" HCIM DGR EWR PWD
8"	3.09m	P4M
8"	2.43m	12 1/8" Integral Blade Stabilizer
8"	1.09m	Non-Mag Float Sub w/non ported valve.
8"	2m	Non-Mag Screen Sub
8"	18.22m	2 x Drill collar
8"	9.69m	Jar
8"	46.87m	5 x Drill collar
8"	8.35m	Intensifier
8"	27.19m	3 x Drill collar
8"	1.1m	Cross Over Sub
5.5"	83.58m	9 x HWDP

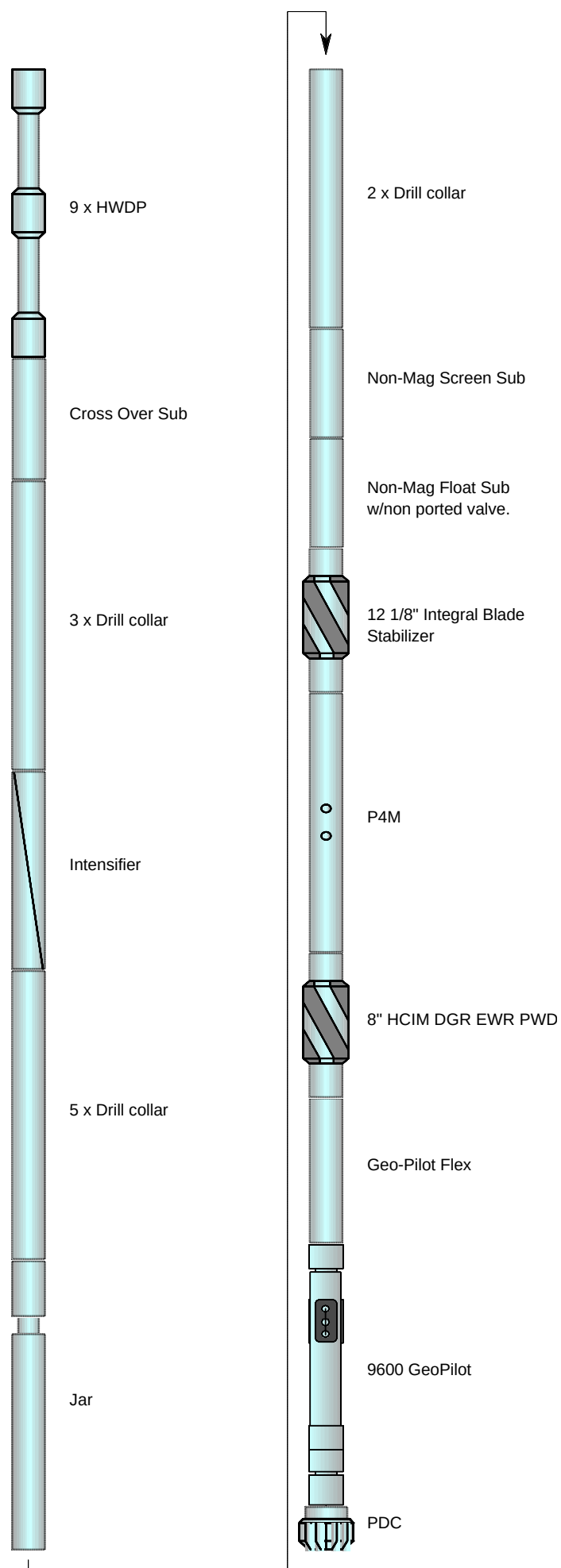
BHA Discussion

P/U to L/O BHA = 74.0hrs (21:00 26-02-06 to 23:00 01-03-06)

Drill hours = 49.5hrs

Total Circ hours = 49.5hrs

Footage = 990m





BHA Report

Customer : Talisman
Well : 15/12-16S
Field : Varg 15/12
Location : Varg South
Rig : Mærsk Giant
Job # : NR-DD-0004058700

BHA# 9

BHA# 9 : Date In : 26-02-2006 MD In (m) : 1365 TVD In (m) : 1355 Date Out : 01-03-2006 MD Out (m) : 2355 TVD Out (m) : 2332

BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (mm ²)	Dull Condition
5rr1	12.250	Security DBS	FMF3643CSC	10699019	9x12	641.3	4-2-CT-N -X-I-WT-ROP

MOTOR DATA

Run #	OD (in)	MFR	Model	Serial#	Bend	Nzl (/32's)	Avg Dif (bar)	Cum Circ Hrs
2								

COMPONENT DATA

Item #	Description	Serial #	OD (in)	ID (in)	Gauge (in)	Weight (kg/m)	Top Con	Length (m)	Bit - Center Blade (m)
1	PDC	10699019	12.250	3.000	12.250	561.78	B 6-5/8" Reg	0.62	
2	9600 GeoPilot	1225TL018	9.625	2.360	12.188	346.76	B 6-5/8" Reg	6.62	
3	Geo-Pilot Flex		8.000	3.000		223.18	B 6-5/8" Reg	2.76	
4	8" HCIM DGR EWR PWD		8.000	2.250	12.250	234.72	B 6-5/8" Reg	10.03	17.75
5	P4M		8.000	2.250		234.72	B 6-5/8" Reg	3.09	
6	12 1/8" Integral Blade Stabilizer	OWS-STAB-1158	8.000	3.000	12.125	219.04	B 6-5/8" Reg	2.43	24.20
7	Non-Mag Float Sub w/non ported valve.	DWS-FS-70372-16	8.000	3.000		219.04	B 6-5/8" Reg	1.09	
8	Non-Mag Screen Sub	174912	8.000	4.000		191.16	B 6-5/8" Reg	2.00	
9	2 x Drill collar		8.000	2.810		223.43	B 6-5/8" Reg	18.22	
10	Jar		8.000	2.813		223.37	B 6-5/8" Reg	9.69	
11	5 x Drill collar		8.000	2.810		223.18	B 6-5/8" Reg	46.87	
12	Intensifier		8.000	2.810		223.43	B 6-5/8" Reg	8.35	
13	3 x Drill collar		8.000	2.810		223.18	B 6-5/8" Reg	27.19	
14	Cross Over Sub		8.000	2.810		223.43	B 5-1/2" FH	1.10	
15	9 x HWDP		5.500	3.375		84.81	B 5-1/2" FH	83.58	
								223.64	

Parameter	Min	Max	Ave
WOB (kg) :	5000	15000	5936
RPM (rpm) :	135	145	139
Flow (L/min) :	2475	3600	3503
SPP (bar) :	200.0	280.0	253.7

Activity	Hrs
Drilling :	49.50
Reaming :	1.50
Circ-Other :	8.50
Total :	59.50

BHA Weight	(kg)
in Air (Total) :	39456
in Mud (Total) :	31685
in Air (Bel Jars) :	11564
in Mud (Bel Jars) :	9286

Drill String	OD(in)	Len(m)
DP(S)-FH-24.70#	5.500	2131

PERFORMANCE

	In	Out
Inclination (deg)	11.21	9.01
Azimuth (deg)	60.59	54.95

	Distance(m)	ROP (m/hr)	Build (°/30m)	Turn (°/30m)	DLS (°/30m)
Oriented :	190.00	20			
Rotated :	800.00	20			
Total :	990.00	20	-0.07	-0.17	0.07

COMMENTS

P/U to L/O BHA = 74.0hrs (21:00 26-02-06 to 23:00 01-03-06)
Drill hours = 49.5hrs
Total Circ hours = 49.5hrs
Footage = 990m

OBJECTIVES:

Continue drilling 12 ¼" hole to below BCU following proposal maintaining 10 degrees and 55 azimuth to 2420m and then building to 26 degrees and turning to an azimuth of 78 to line up on target for rotary assembly in 8 ½" section

RESULTS:

After washing to bottom and drilling 4 metres of formation, the hole started to pack off, torque and pressure spikes were experienced and the string was worked slowly until circulation was reestablished and the parameters became stable.

As soon as the bit was returned to bottom the assembly started to pack off again, once again the string was lifted and worked slowly while large amounts of fresh cuttings/cavings were circulated over the shakers. It was eventually possible to work the bit to bottom and recommence drilling. ROP had to be carefully controlled and further packoffs occurred whenever the rate increased.

At 1406m a wiper trip to the shoe was made, 2m of fill were found on returning to bottom and thereafter drilling became less problematic and the ROP could be increased gradually to 50m/hr.

High ROP's were maintained throughout the claystone but these slowed once the Balder formation was encountered.

At 2355m, 33m into the Lista formation, the ROP slowed down to 3m per hour. Even though a wide range of different parameters were tried it was impossible to improve this.

The assembly was pulled out of the hole in order to change the bit.

On surface the bit was badly worn around the nose area and was graded 4-2-CT-N X-I-WT-ROP

BHA Schematic

Talisman

15/12-16S

BHA ID #: 10

12¼" GeoPilot#3

BHA Configuration

O.D.	Length	Description
12.25"	0.5m	PDC
9.625"	6.62m	9600 GeoPilot
8"	2.76m	Geo-Pilot Flex
8"	10.03m	8" HCIM DGR EWR PWD
8"	3.09m	P4M
8"	2.43m	12 1/8" Integral Blade Stabilizer
8"	1.09m	Non-Mag Float Sub w/non ported valve.
8"	2m	Non-Mag Screen Sub
8"	18.22m	2 x Drill collar
8"	9.69m	Jar
8"	46.87m	5 x Drill collar
8"	8.35m	Intensifier
8"	27.19m	3 x Drill collar
8"	1.1m	Cross Over Sub
5.5"	83.58m	8 x HWDP

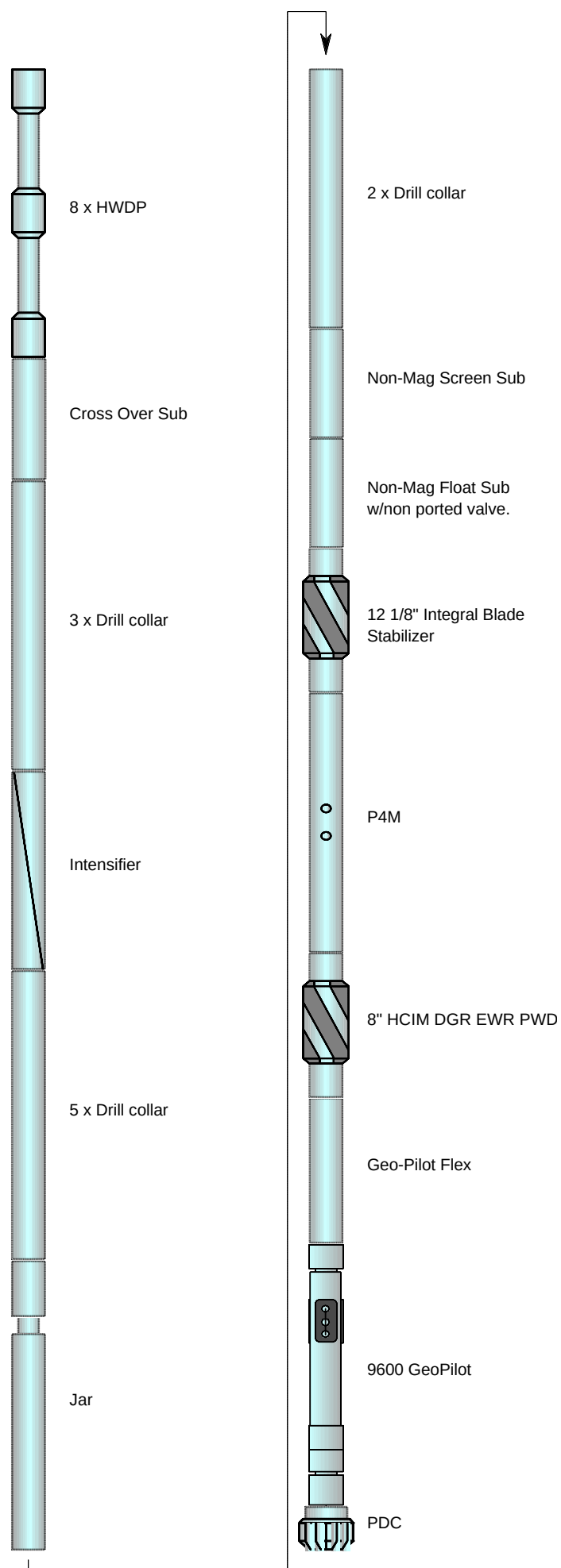
BHA Discussion

P/U to L/O BHA = 45.5hrs (03:00 02-03-06 to 00:30 04-03-06)

Drill hours = 19.5hrs

Total Circ hours = 27.5hrs

Footage = 119m





BHA Report

Customer : Talisman
Well : 15/12-16S
Field : Varg 15/12
Location : Varg South
Rig : Mærsk Giant
Job # : NR-DD-0004058700

BHA# 10

BHA# 10 : Date In : 02-03-2006 MD In (m) : 2355 TVD In (m) : 2332 Date Out : 04-03-2006 MD Out (m) : 2474 TVD Out (m) : 2449

BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (mm²)	Dull Condition
6	12.250	Security DBS	FMF3961ZSC	10719632	9x12	641.3	0-0-NO-A -X-I-NO-DTF

MOTOR DATA

Run #	OD (in)	MFR	Model	Serial#	Bend	Nzl (/32's)	Avg Dif (bar)	Cum Circ Hrs
3								

COMPONENT DATA

Item #	Description	Serial #	OD (in)	ID (in)	Gauge (in)	Weight (kg/m)	Top Con	Length (m)	Bit - Center Blade (m)
1	PDC	10719632	12.250	3.000	12.250	561.78	B 6-5/8" Reg	0.50	
2	9600 GeoPilot	1225TL018	9.625	2.360	12.188	346.76	B 6-5/8" Reg	6.62	
3	Geo-Pilot Flex		8.000	3.000		223.18	B 6-5/8" Reg	2.76	
4	8" HCIM DGR EWR PWD		8.000	2.250	12.250	234.72	B 6-5/8" Reg	10.03	17.63
5	P4M		8.000	2.250		234.72	B 6-5/8" Reg	3.09	
6	12 1/8" Integral Blade Stabilizer	OWS-STAB-1158	8.000	3.000	12.125	219.04	B 6-5/8" Reg	2.43	24.08
7	Non-Mag Float Sub w/non ported valve.	DWS-FS-70372-16	8.000	3.000		219.04	B 6-5/8" Reg	1.09	
8	Non-Mag Screen Sub	174912	8.000	4.000		191.16	B 6-5/8" Reg	2.00	
9	2 x Drill collar		8.000	2.810		223.43	B 6-5/8" Reg	18.22	
10	Jar		8.000	2.813		223.37	B 6-5/8" Reg	9.69	
11	5 x Drill collar		8.000	2.810		223.18	B 6-5/8" Reg	46.87	
12	Intensifier		8.000	2.810		223.43	B 6-5/8" Reg	8.35	
13	3 x Drill collar		8.000	2.810		223.18	B 6-5/8" Reg	27.19	
14	Cross Over Sub		8.000	2.810		223.43	B 5-1/2" FH	1.10	
15	HWDP		5.500	3.375		84.81	B 5-1/2" FH	83.58	
								223.52	

Parameter	Min	Max	Ave
WOB (kg)	1000	20000	18210
RPM (rpm)	100	140	123
Flow (L/min)	3550	3690	3658
SPP (bar)	280.0	295.0	288.4

Activity	Hrs
Drilling	19.50
Reaming	2.50
Circ-Other	5.50
Total	27.50

BHA Weight	(kg)
in Air (Total)	39389
in Mud (Total)	31581
in Air (Bel Jars)	11496
in Mud (Bel Jars)	9217

Drill String	OD(in)	Len(m)
DP(S)-FH-21.90#	5.500	2250

PERFORMANCE

	In	Out
Inclination (deg)	9.01	8.77
Azimuth (deg)	54.95	58.20

	Distance(m)	ROP (m/hr)	Build (°/30m)	Turn (°/30m)	DLS (°/30m)
Oriented	10.00	14			
Rotated	109.00	5			
Total	119.00	6	-0.06	0.82	0.14

COMMENTS

P/U to L/O BHA = 45.5hrs (03:00 02-03-06 to 00:30 04-03-06)
Drill hours = 19.5hrs
Total Circ hours = 27.5hrs
Footage = 119m

OBJECTIVES:

Continue drilling 12 ¼" hole to section TD according to plan.

RESULTS:

Tripped to bottom washing carefully through tight spots.

The first metre was drilled with minimum parameters in order to cut a profile for the new bit.

After this drilling parameters were varied constantly in an effort to improve ROP, but no better than 10m/hr average, and mostly less than this, could be achieved.

The proposed build and turn was initiated at 2420m as planned but shortly afterwards it became apparent that the GeoPilot was not working correctly and that it would not be possible to steer through the section.

It was decided to drill down into the Shetland chalk to see if the bit would perform better in this formation.

Before pulling out drilling was continued to 2474m and an ROP of 35m/hr was achieved in the Shetland chalk. The low ROP above the chalk may have been caused by high overbalance.

The assembly was then pulled to pick up a new GeoPilot.

On surface the bit was as good as new and graded 0-0-NO-A X-I NO-DTF

BHA Schematic

Talisman

15/12-16S

BHA ID #: 11

12¼" GeoPilot#4

BHA Configuration

O.D.	Length	Description
12.25"	0.5m	PDC
9.625"	6.62m	9600 GeoPilot
8"	2.76m	Geo-Pilot Flex
8"	10.03m	8" HCIM DGR EWR PWD
8"	3.09m	P4M
8"	2.43m	12 1/8" Integral Blade Stabilizer
8"	1.09m	Non-Mag Float Sub w/non ported valve.
8"	2m	Non-Mag Screen Sub
8"	18.22m	2 x Drill collar
8"	9.69m	Jar
8"	46.87m	5 x Drill collar
8"	8.35m	Intensifier
8"	27.19m	3 x Drill collar
8"	1.1m	Cross Over Sub
5.5"	83.58m	9 x HWDP

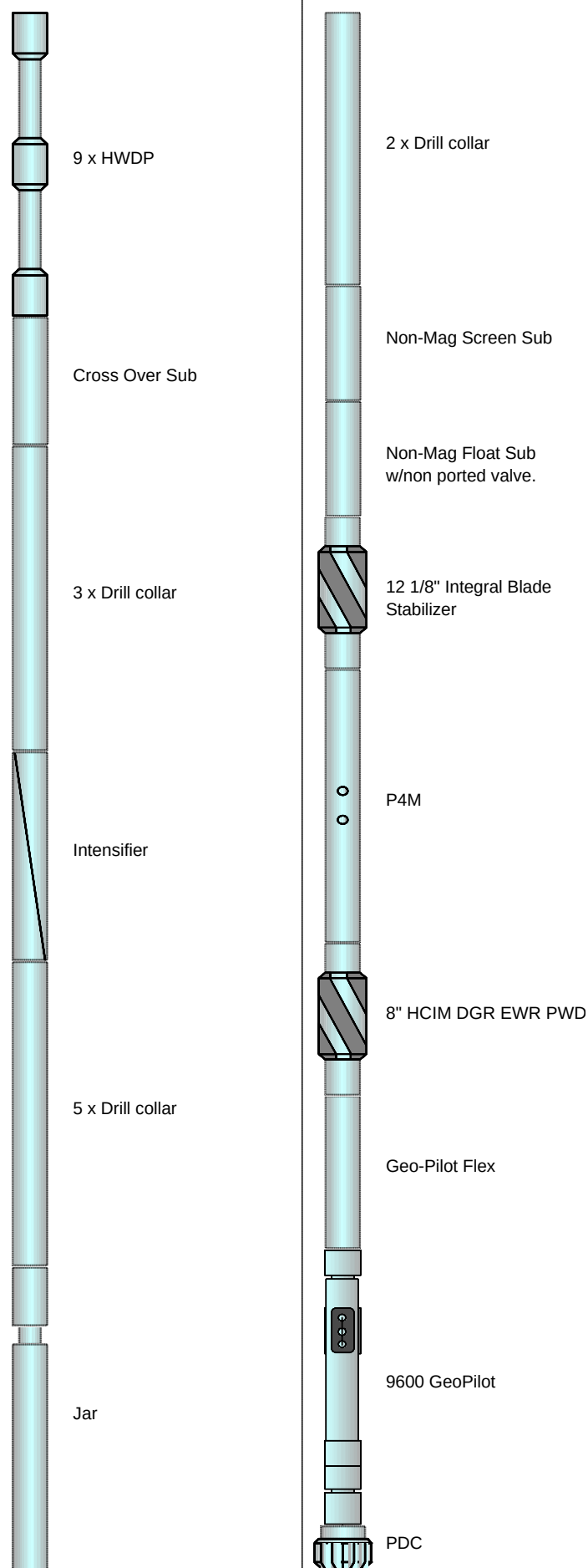
BHA Discussion

P/U to L/O BHA = 88.0hrs (05:30 04-03-06 to 21:30 07-03-06)

Drill hours = 35.5hrs

Total Circ hours = 45.0hrs

Footage = 361m





BHA Report

Customer : Talisman
Well : 15/12-16S
Field : Varg 15/12
Location : Varg South
Rig : Mærsk Giant
Job # : NR-DD-0004058700

BHA# 11

BHA# 11 : Date In : 04-03-2006 MD In (m) : 2474 TVD In (m) : 2449 Date Out : 08-03-2006 MD Out (m) : 2835 TVD Out (m) : 2786

BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (mm²)	Dull Condition
6rr1	12.250	Security DBS	FMF3961ZSC	10719632	9x12	641.3	1-1-WT-A -X-I-NO-TD

MOTOR DATA

Run #	OD (in)	MFR	Model	Serial#	Bend	Nzl (/32's)	Avg Dif (bar)	Cum Circ Hrs
4								

COMPONENT DATA

Item #	Description	Serial #	OD (in)	ID (in)	Gauge (in)	Weight (kg/m)	Top Con	Length (m)	Bit - Center Blade (m)
1	PDC	10719632	12.250	3.000	12.250	561.78	B 6-5/8" Reg	0.50	
2	9600 GeoPilot	1225TL018	9.625	2.360	12.188	346.76	B 6-5/8" Reg	6.62	
3	Geo-Pilot Flex		8.000	3.000		223.18	B 6-5/8" Reg	2.76	
4	8" HCIM DGR EWR PWD		8.000	2.250	12.250	234.72	B 6-5/8" Reg	10.03	17.63
5	P4M		8.000	2.250		234.72	B 6-5/8" Reg	3.09	
6	12 1/8" Integral Blade Stabilizer	OWS-STAB-1158	8.000	3.000	12.125	219.04	B 6-5/8" Reg	2.43	24.08
7	Non-Mag Float Sub w/non ported valve.	DWS-FS-70372-16	8.000	3.000		219.04	B 6-5/8" Reg	1.09	
8	Non-Mag Screen Sub	174912	8.000	4.000		191.16	B 6-5/8" Reg	2.00	
9	2 x Drill collar		8.000	2.810		223.43	B 6-5/8" Reg	18.22	
10	Jar		8.000	2.813		223.37	B 6-5/8" Reg	9.69	
11	5 x Drill collar		8.000	2.810		223.18	B 6-5/8" Reg	46.87	
12	Intensifier		8.000	2.810		223.43	B 6-5/8" Reg	8.35	
13	3 x Drill collar		8.000	2.810		223.18	B 6-5/8" Reg	27.19	
14	Cross Over Sub		8.000	2.810		223.43	B 5-1/2" FH	1.10	
15	9 x HWDP		5.500	3.375		84.81	B 5-1/2" FH	83.58	
								223.52	

Parameter	Min	Max	Ave
WOB (kg)	7000	13000	9571
RPM (rpm)	120	150	143
Flow (L/min)	3300	3700	3538
SPP (bar)	285.0	305.0	293.4

Activity	Hrs
Drilling	35.50
Reaming	2.50
Circ-Other	7.00
Total	45.00

BHA Weight	(kg)
in Air (Total)	39389
in Mud (Total)	31531
in Air (Bel Jars)	11496
in Mud (Bel Jars)	9203

Drill String	OD(in)	Len(m)
DP(S)-FH-21.90#	5.500	2611

PERFORMANCE

	In	Out
Inclination (deg)	8.77	27.68
Azimuth (deg)	58.20	73.47

	Distance(m)	ROP (m/hr)	Build (°/30m)	Turn (°/30m)	DLS (°/30m)
Oriented	335.00	10			
Rotated	26.00	9			
Total	361.00	10	1.57	1.27	1.61

COMMENTS

P/U to L/O BHA = 88.0hrs (05:30 04-03-06 to 21:30 07-03-06)
Drill hours = 35.5hrs
Total Circ hours = 45.0hrs
Footage = 361m

OBJECTIVES:

Continue drilling 12 ¼" hole to TD, building angle and turning according to planned wellpath

RESULTS:

Tripped to bottom and washed down last 2 stands finding 15m of fill.

Commenced drilling and immediately deflected the GeoPilot in order to catch up with the delayed turn and build.

This was done without problem and the well was on track at 2766m when a hose on the top drive bursted and it was necessary to pull back into the shoe in order to fix it.

The hose was replaced and the bit was tripped back to bottom and drilling continued to 2835m where a sample was circulated up for possible casing pick and the Geologists decided to call TD.

The trip out was smooth and on surface the bit was graded 1-1-WT-A X-I-NO-TD

BHA Schematic

Talisman

15/12-16S

BHA ID #: 12

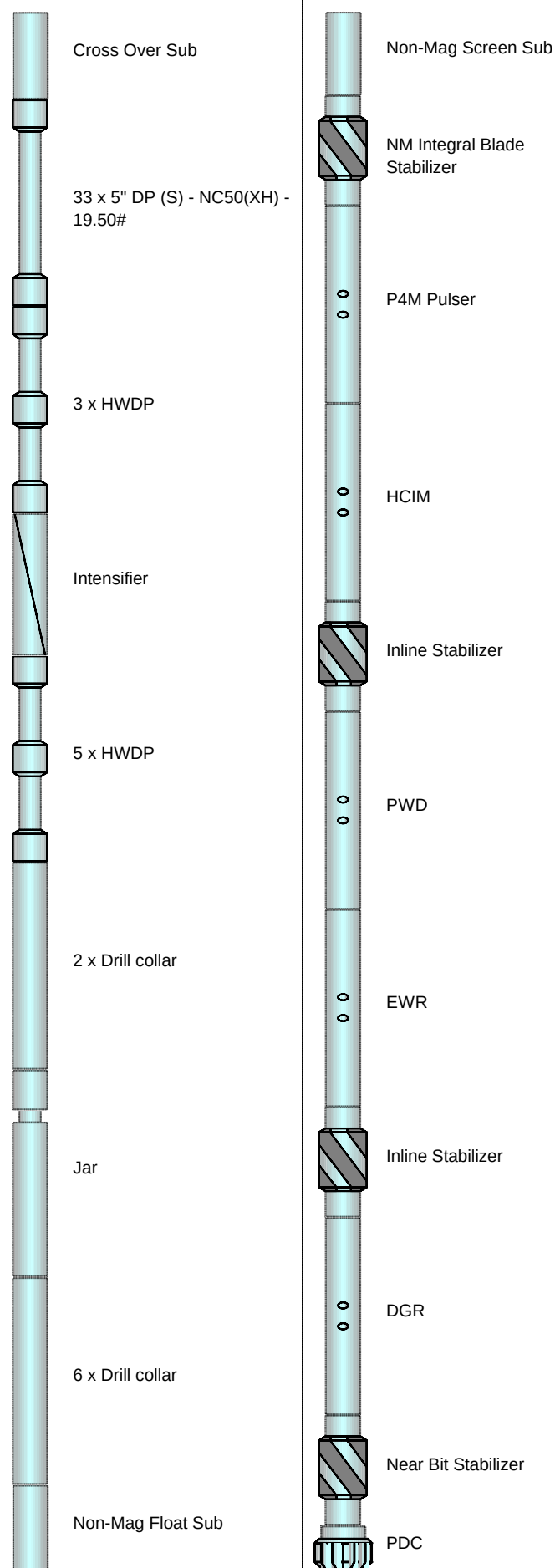
8½" Rotary Assembly

BHA Configuration

O.D.	Length	Description
8.5"	0.28m	PDC
6.75"	2.2m	Near Bit Stabilizer
6.75"	1.38m	DGR
6.75"	0.59m	Inline Stabilizer
6.75"	3.65m	EWR
6.75"	1.3m	PWD
6.75"	0.6m	Inline Stabilizer
6.75"	2.12m	HCIM
6.75"	4.67m	P4M Pulser
6.5"	2.02m	NM Integral Blade Stabilizer
6.75"	2.18m	Non-Mag Screen Sub
6.75"	0.97m	Non-Mag Float Sub
6.75"	55.98m	6 x Drill collar
6.5"	9.64m	Jar
6.75"	18.51m	2 x Drill collar
5"	47.43m	5 x HWDP
6.5"	9.16m	Intensifier
5"	28.07m	3 x HWDP
5"	312.35m	33 x 5" DP (S) - NC50(XH) - 19.50#
5.5"	0.56m	Cross Over Sub

BHA Discussion

P/U to L/O BHA = 48.5hrs (15:00 10-03-06 to 15:30 12-03-06)
 Drill hours = 8.0hrs
 Total Circ hours = 27.5hrs
 Footage = 126m





BHA Report

Customer : Talisman
Well : 15/12-16S
Field : Varg 15/12
Location : Varg South
Rig : Mærsk Giant
Job # : NR-DD-0004058700

BHA# 12

BHA# 12 : Date In :10-03-2006 MD In (m) : 2835 TVD In (m) : 2786 Date Cur: 12-03-2006 MD Cur (m): 2961 TVD Cur (m): 2897

BIT DATA

Bit #	OD (in)	MFR	Style	Serial#	Nozzles (/32's)	TFA (mm²)	Dull Condition
7	8.500	Security DBS	FM3755Z	10716385	4x18	641.3	0-0-WT-A-X-I-NO-TD

MOTOR DATA

Run #	OD (in)	MFR	Model	Serial#	Bend	Nzl (/32's)	Avg Dif (bar)	Cum Circ Hrs

COMPONENT DATA

Item #	Description	Serial #	OD (in)	ID (in)	Gauge (in)	Weight (kg/m)	Top Con	Length (m)	Bit - Center Blade (m)
1	PDC	10716385	8.500	3.000	8.500	251.89	B 4-1/2" Reg	0.28	
2	Near Bit Stabilizer	OWSSTAB812	6.750	3.000	8.500	145.61	B 4-1/2" IF	2.20	1.26
3	DGR		6.750	1.920		166.77	B 4-1/2" IF	1.38	
4	Inline Stabilizer		6.750	1.920	8.405	166.77	B 4-1/2" IF	0.59	4.26
5	EWR		6.750	1.920		166.77	B 4-1/2" IF	3.65	
6	PWD	OWS24021	6.750	1.920		166.77	B 4-1/2" IF	1.30	
7	Inline Stabilizer		6.750	1.920	8.405	166.77	B 4-1/2" IF	0.60	9.80
8	HCIM		6.750	1.920		166.77	B 4-1/2" IF	2.12	
9	P4M Pulser		6.750	1.920		166.77	B 4-1/2" IF	4.67	
10	NM Integral Blade Stabilizer	174902	6.500	2.875	8.500	135.34	B 4-1/2" IF	2.02	17.69
11	Non-Mag Screen Sub	OWSFS062	6.750	2.875		148.53	B 4-1/2" IF	2.18	
12	Non-Mag Float Sub	4286578400	6.750	2.813		149.94	B 4-1/2" IF	55.98	
13	6 x Drill collar		6.750	2.250		148.10	B 4-1/2" IF	9.64	
14	Jar		6.750	3.250		139.86	B 4-1/2" IF	18.51	
15	2 x Drill collar		5.000	3.000		73.35	B 4-1/2" IF	47.43	
16	5 x HWDP	4086506700	6.500	2.250		148.10	B 4-1/2" IF	9.16	
17	Intensifier		5.000	3.000		73.35	B 4-1/2" IF	28.07	
18	3 x HWDP		5.000	4.276		33.63	B 4-1/2" IF	312.35	
19	33 x 5" DP (S) - NC50(XH) - 19.50#		5.500	3.000		84.63	B 5-1/2" FH	0.56	
20	Cross Over Sub							503.66	

Parameter	Min	Max	Ave
WOB (kg) :	5000	8000	7214
RPM (rpm) :	130	140	133
Flow (L/min) :	1920	2000	1979
SPP (bar) :	110.0	135.0	128.5

Activity	Hrs
Drilling :	8.00
Reaming :	13.00
Circ-Other :	7.00
Total :	28.00

BHA Weight	(kg)
in Air (Total) :	33374
in Mud (Total) :	28709
in Air (Bel Jars) :	11912
in Mud (Bel Jars) :	10247

Drill String	OD(in)	Len(m)
DP(S)-FH-21.90#	5.500	2457

PERFORMANCE

	In	Out
Inclination (deg)	27.68	28.63
Azimuth (deg)	73.47	73.36

	Distance(m)	ROP (m/hr)	Build (°/30m)	Turn (°/30m)	DLS (°/30m)
Oriented :	0.00	0			
Rotated :	126.00	16	0.30	0.00	
Total :	126.00	16	0.23	-0.03	0.23

COMMENTS

P/U to L/O BHA = 48.5hrs (15:00 10-03-06 to 15:30 12-03-06)
Drill hours = 8.0hrs
Total Circ hours = 27.5hrs
Footage = 126m

OBJECTIVES:

Drill to 5 ½" liner setting depth with rotary assembly. Hold azimuth and inclination.

RESULTS:

Drilled out shoetrack without problems.

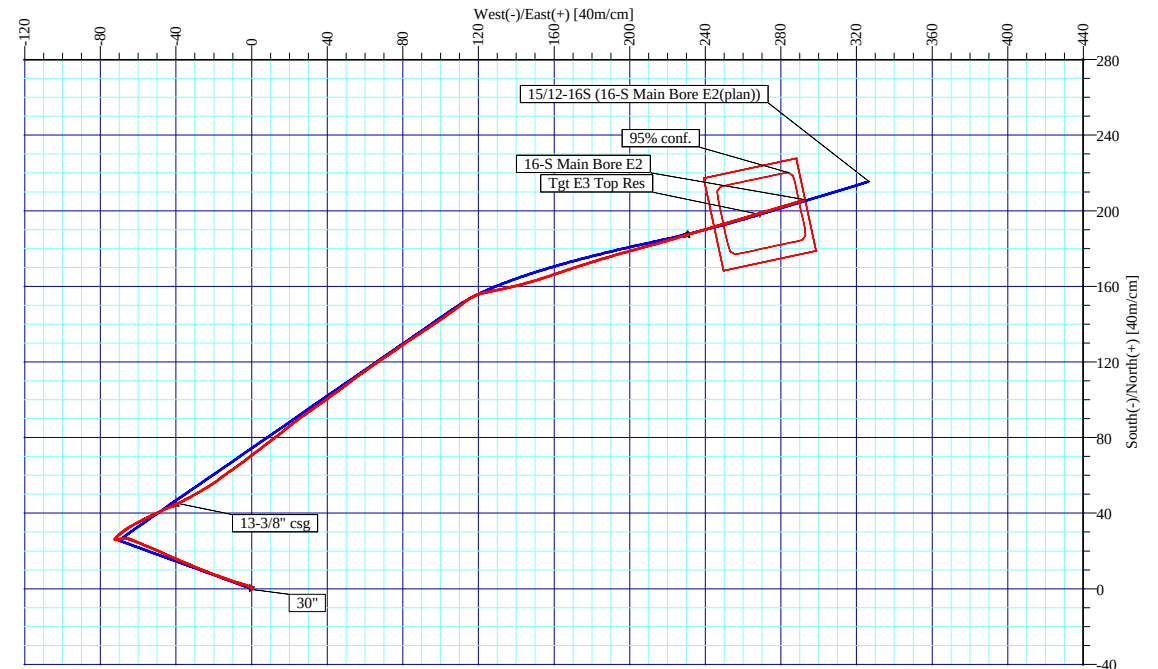
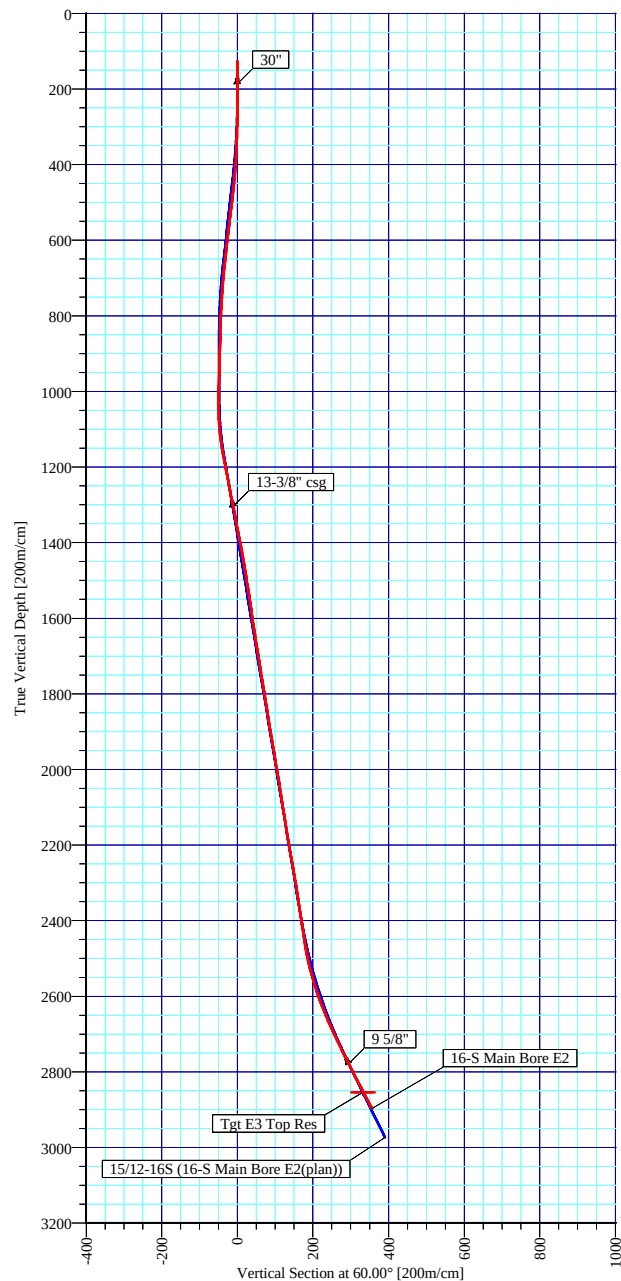
The assembly built by approximately 0.3 deg/30m and held direction.

Typical drilling parameters were WOB of 2 - 5 mton at 130 rpm, with flowrate of 1900lpm and a SPP of 126 bar. The avg. ROP for the run was 27 m/hr.

TD was called early when the samples showed traces of claystone confirming the bottom of the Heather formation had been reached. The reservoir thickness was only approximately 30m TVD thick, which was less than expected.

Bit Grading was 0-0-WT-A-X-I-NO-TD

11.6 Well Profile



WELLPATH DETAILS

16-S Main Bore E2

Rig:	RKB 39.5m		
Ref. Datum:	39.50m		
V.Section Angle	Origin +N/-S	Origin +E/-W	Starting From TVD
60.00°	0.00	0.00	126.50

SURVEY PROGRAM

Date : 10-05-2006 Validated : No Version : 9

Depth Fm	Depth To	Survey/Plan	Tool
183.12	343.60	16S_Evader Gyro 17½"	SDC NS Gyro
362.40	1294.20	16S_MWD 17½"	MWD+SAG
1294.20	2825.70	16S_MWD 12¼"	MWD+SAG
2854.80	2947.00	16S_MWD 8½"	MWD+SAG
2961.00	2961.00	16S_Projected to TD	BLIND

CASING DETAILS

No.	TVD	MD	Name	Size
1	186.90	186.90	30"	30.000
2	1303.77	1312.70	13-3/8" csg	13.375
3	2777.82	2825.70	9 5/8"	9.625

Wellpath: (15/12-16S/16-S Main Bore E2)

Created By: Lai Le Van

Date: 10-05-2006

Checked: _____

Date: _____

Reviewed: _____

Date: _____

Approved: _____

Date: _____

WELL DETAILS

Name	+N/-S	+E/-W	Northing	Easting	Latitude	Longitude	Slot
15/12-16S	0.00	0.00	6432466.99	436472.16	58°01'40.393N	001°55'27.968E	N/A

11.7 Deviation Survey

Company: Talisman			Date: 10-05-2006		Time: 08:19:59		Page: 1	
Field: Varg 15/12			Co-ordinate(NE) Reference:		Site: 15/12-16, Grid North			
Site: 15/12-16			Vertical (TVD) Reference:		RKB 39.5m 39.5			
Well: 15/12-16S			Section (VS) Reference:		Well (0.00N,0.00E,60.00Azi)			
Wellpath: 16-S Main Bore E2			Survey Calculation Method:		Minimum Curvature		Db: Oracle	

Field: Varg 15/12 Norwegian Sea Norway			Map System: Universal Transverse Mercator			Map Zone: UTM Zone 31, North 0 to 6E		
Geo Datum: ED50 (International 1924)			Coordinate System:			Site Centre		
Sys Datum: Mean Sea Level			Geomagnetic Model:			bggm2005		

Site: 15/12-16		
Site Position:		
From: Map	Northing: 6432466.99 m	Latitude: 58 1 40.393 N
Position Uncertainty: 0.00 m	Easting: 436472.16 m	Longitude: 1 55 27.968 E
Water Depth: 87.00 m		North Reference: Grid
		Grid Convergence: -0.91 deg

Well: 15/12-16S			Slot Name:		
Surface Position: +N/-S 0.00 m	Northing: 6432466.99 m	Latitude: 58 1 40.393 N			
+E/-W 0.00 m	Easting : 436472.16 m	Longitude: 1 55 27.968 E			
Position Uncertainty: 0.00 m					
Reference Point: +N/-S 0.00 m	Northing: 6432466.99 m	Latitude: 58 1 40.393 N			
+E/-W 0.00 m	Easting : 436472.16 m	Longitude: 1 55 27.968 E			
	Measured Depth: 126.50 m	Inclination: 0.00 deg			
	Vertical Depth: 126.50 m	Azimuth : 0.00 deg			

Wellpath: 16-S Main Bore E2			Drilled From: Well Ref. Point		
Current Datum: RKB 39.5m			Tie-on Depth: 126.50 m		
Magnetic Data: 16-02-2006			Above System Datum: Mean Sea Level		
Field Strength: 50209 nT			Declination: -2.45 deg		
Vertical Section: Depth From (TVD)			Mag Dip Angle: 71.35 deg		
	+N/-S		+E/-W		
	m		Direction		
			deg		
126.50	0.00	0.00	60.00		

Survey Program for Definitive Wellpath					
Date: 10-05-2006		Validated: No		Version: 9	
Actual From		To		Toolcode	
m		m		m	
				Tool Name	
183.12	343.60	16S_Evader Gyro 17½" (183.12-3		SDC NS Gyro	
362.40	1294.20	16S_MWD 17½" (362.40-1294.20)		MWD + Sag correction	
1294.20	2825.70	16S_MWD 12¼" (1294.20-2825.70)		MWD + Sag correction	
2854.80	2947.00	16S_MWD 8½" (2854.80-2947.00)		MWD + Sag correction	
2961.00	2961.00	16S_Protected to TD (2961.00-2		BLIND	
				Blind drilling	

Survey										
MD	Incl	Azim	TVD	+N/-S	+E/-W	VS	DLS	Build	Turn	Tool/Comment
m	deg	deg	m	m	m	m	deg/30m	deg/30m	deg/30m	
126.50	0.00	0.00	126.50	0.00	0.00	0.00	0.000	0.000	0.000	TIE LINE
183.12	0.70	150.71	183.12	-0.30	0.17	0.00	0.371	0.371	0.000	SDC NS Gyro
186.90	0.51	135.53	186.90	-0.33	0.19	0.00	1.949	-1.491	-120.467	30"
205.87	0.97	27.01	205.87	-0.25	0.32	0.16	1.949	0.724	-171.620	SDC NS Gyro
233.78	0.79	335.91	233.77	0.13	0.35	0.37	0.834	-0.193	-54.927	SDC NS Gyro
256.57	1.76	306.30	256.56	0.49	0.01	0.25	1.503	1.277	-38.978	SDC NS Gyro
285.69	2.20	296.26	285.66	1.00	-0.85	-0.24	0.576	0.453	-10.343	SDC NS Gyro
314.09	2.38	292.73	314.04	1.47	-1.89	-0.90	0.241	0.190	-3.729	SDC NS Gyro
343.60	2.29	285.51	343.52	1.86	-3.02	-1.69	0.312	-0.091	-7.340	SDC NS Gyro
362.40	3.64	286.76	362.30	2.13	-3.95	-2.36	2.157	2.154	1.995	MWD+SAG
393.30	5.75	286.23	393.09	2.85	-6.38	-4.10	2.049	2.049	-0.515	MWD+SAG
422.20	7.53	289.07	421.80	3.87	-9.56	-6.34	1.878	1.848	2.948	MWD+SAG
451.00	8.82	289.72	450.31	5.23	-13.42	-9.01	1.347	1.344	0.677	MWD+SAG
479.90	9.88	290.10	478.82	6.83	-17.84	-12.03	1.102	1.100	0.394	MWD+SAG
508.80	10.89	291.16	507.25	8.67	-22.71	-15.33	1.067	1.048	1.100	MWD+SAG
537.70	10.83	292.03	535.63	10.68	-27.77	-18.71	0.181	-0.062	0.903	MWD+SAG
566.50	10.98	292.33	563.91	12.73	-32.82	-22.06	0.167	0.156	0.312	MWD+SAG
595.40	11.03	293.45	592.28	14.88	-37.90	-25.38	0.228	0.052	1.163	MWD+SAG
624.20	11.09	294.39	620.54	17.12	-42.95	-28.64	0.198	0.062	0.979	MWD+SAG
653.00	11.08	294.01	648.81	19.39	-48.00	-31.88	0.077	-0.010	-0.396	MWD+SAG
681.90	9.28	291.78	677.25	21.38	-52.70	-34.95	1.912	-1.869	-2.315	MWD+SAG

Company: Talisman	Date: 10-05-2006	Time: 08:19:59	Page: 2
Field: Varg 15/12	Co-ordinate(NE) Reference: Site: 15/12-16, Grid North		
Site: 15/12-16	Vertical (TVD) Reference: RKB 39.5m 39.5		
Well: 15/12-16S	Section (VS) Reference: Well (0.00N,0.00E,60.00Azi)		
Wellpath: 16-S Main Bore E2	Survey Calculation Method: Minimum Curvature		Db: Oracle

Survey

MD m	Incl deg	Azim deg	TVD m	+N/-S m	+E/-W m	VS m	DLS deg/30m	Build deg/30m	Turn deg/30m	Tool/Comment
710.70	7.80	293.47	705.73	23.02	-56.65	-37.55	1.564	-1.542	1.760	MWD+SAG
739.50	7.03	291.99	734.29	24.46	-60.08	-39.80	0.826	-0.802	-1.542	MWD+SAG
768.40	5.55	290.86	763.01	25.62	-63.02	-41.77	1.542	-1.536	-1.173	MWD+SAG
797.30	3.64	287.35	791.82	26.39	-65.21	-43.27	2.003	-1.983	-3.644	MWD+SAG
826.10	2.63	277.92	820.58	26.76	-66.73	-44.41	1.178	-1.052	-9.823	MWD+SAG
855.00	1.40	255.57	849.46	26.76	-67.73	-45.28	1.492	-1.277	-23.201	MWD+SAG
883.80	1.43	254.87	878.25	26.58	-68.42	-45.96	0.036	0.031	-0.729	MWD+SAG
912.70	1.50	254.77	907.14	26.38	-69.13	-46.68	0.073	0.073	-0.104	MWD+SAG
941.60	1.49	258.69	936.03	26.21	-69.87	-47.40	0.107	-0.010	4.069	MWD+SAG
970.40	1.58	258.92	964.82	26.06	-70.62	-48.13	0.094	0.094	0.240	MWD+SAG
999.30	1.59	262.44	993.71	25.93	-71.41	-48.88	0.102	0.010	3.654	MWD+SAG
1028.00	1.52	266.86	1022.40	25.86	-72.19	-49.59	0.145	-0.073	4.620	MWD+SAG
1056.80	1.32	21.42	1051.19	26.15	-72.45	-49.67	2.491	-0.208	119.333	MWD+SAG
1085.70	3.50	44.01	1080.07	27.09	-71.71	-48.56	2.426	2.263	23.450	MWD+SAG
1114.60	5.98	48.60	1108.87	28.72	-69.97	-46.23	2.602	2.574	4.765	MWD+SAG
1143.40	8.24	53.67	1137.44	30.94	-67.18	-42.71	2.441	2.354	5.281	MWD+SAG
1172.30	10.74	60.83	1165.95	33.48	-63.16	-37.96	2.865	2.595	7.433	MWD+SAG
1201.10	11.05	62.49	1194.23	36.06	-58.37	-32.52	0.459	0.323	1.729	MWD+SAG
1230.00	11.18	64.37	1222.58	38.55	-53.39	-26.96	0.400	0.135	1.952	MWD+SAG
1258.80	10.99	65.51	1250.85	40.90	-48.37	-21.44	0.302	-0.198	1.187	MWD+SAG
1287.70	11.02	66.30	1279.22	43.15	-43.34	-15.96	0.160	0.031	0.820	MWD+SAG
1294.20	10.89	65.88	1285.60	43.65	-42.21	-14.73	0.704	-0.600	-1.938	MWD+SAG
1312.70	10.88	64.38	1303.77	45.12	-39.04	-11.25	0.461	-0.022	-2.438	13-3/8" csg
1338.20	10.87	62.30	1328.81	47.28	-34.74	-6.45	0.461	-0.008	-2.443	MWD+SAG
1368.20	11.25	60.39	1358.25	50.04	-29.69	-0.69	0.528	0.380	-1.910	MWD+SAG
1397.20	11.35	59.78	1386.69	52.87	-24.77	4.99	0.161	0.103	-0.631	MWD+SAG
1426.10	10.37	55.14	1415.07	55.79	-20.17	10.42	1.362	-1.017	-4.817	MWD+SAG
1454.50	9.77	52.75	1443.03	58.71	-16.16	15.36	0.772	-0.634	-2.525	MWD+SAG
1483.40	9.59	55.46	1471.52	61.56	-12.22	20.19	0.509	-0.187	2.813	MWD+SAG
1511.80	9.13	54.17	1499.54	64.22	-8.45	24.79	0.534	-0.486	-1.363	MWD+SAG
1540.60	8.87	53.42	1527.99	66.88	-4.81	29.27	0.297	-0.271	-0.781	MWD+SAG
1569.40	8.48	52.63	1556.46	69.49	-1.34	33.58	0.425	-0.406	-0.823	MWD+SAG
1597.90	8.42	52.86	1584.65	72.03	1.99	37.74	0.072	-0.063	0.242	MWD+SAG
1625.90	8.25	52.01	1612.35	74.50	5.21	41.76	0.225	-0.182	-0.911	MWD+SAG
1655.20	9.02	52.63	1641.32	77.19	8.69	46.12	0.794	0.788	0.635	MWD+SAG
1685.00	9.22	52.55	1670.75	80.06	12.44	50.81	0.202	0.201	-0.081	MWD+SAG
1713.90	9.13	51.56	1699.28	82.89	16.08	55.37	0.189	-0.093	-1.028	MWD+SAG
1742.80	9.09	51.75	1727.81	85.73	19.67	59.90	0.052	-0.042	0.197	MWD+SAG
1771.30	9.60	52.15	1755.93	88.58	23.31	64.48	0.541	0.537	0.421	MWD+SAG
1800.40	9.36	55.65	1784.64	91.41	27.18	69.24	0.644	-0.247	3.608	MWD+SAG
1829.40	9.15	55.07	1813.26	94.06	31.02	73.89	0.238	-0.217	-0.600	MWD+SAG
1858.60	9.06	54.32	1842.09	96.73	34.79	78.49	0.153	-0.092	-0.771	MWD+SAG
1887.20	8.99	54.05	1870.34	99.35	38.43	82.95	0.086	-0.073	-0.283	MWD+SAG
1915.70	9.47	54.64	1898.47	102.02	42.14	87.50	0.515	0.505	0.621	MWD+SAG
1944.30	9.78	53.26	1926.66	104.83	46.01	92.26	0.405	0.325	-1.448	MWD+SAG
1972.70	9.61	52.91	1954.66	107.70	49.83	97.01	0.190	-0.180	-0.370	MWD+SAG
2001.80	9.55	53.15	1983.35	110.62	53.70	101.81	0.074	-0.062	0.247	MWD+SAG
2030.80	9.31	54.23	2011.96	113.43	57.53	106.54	0.308	-0.248	1.117	MWD+SAG
2060.00	9.20	54.93	2040.78	116.15	61.36	111.21	0.162	-0.113	0.719	MWD+SAG
2089.10	9.09	55.52	2069.51	118.79	65.15	115.82	0.149	-0.113	0.608	MWD+SAG
2117.80	9.07	55.83	2097.85	121.34	68.89	120.34	0.055	-0.021	0.324	MWD+SAG
2147.00	8.95	55.17	2126.69	123.93	72.66	124.90	0.163	-0.123	-0.678	MWD+SAG
2176.20	8.81	55.04	2155.54	126.51	76.36	129.39	0.145	-0.144	-0.134	MWD+SAG
2204.90	9.63	55.62	2183.87	129.13	80.14	133.97	0.863	0.857	0.606	MWD+SAG
2233.50	10.08	56.46	2212.05	131.86	84.20	138.85	0.496	0.472	0.881	MWD+SAG
2261.70	10.02	56.65	2239.82	134.57	88.31	143.76	0.073	-0.064	0.202	MWD+SAG
2290.30	9.79	57.12	2267.99	137.26	92.43	148.68	0.256	-0.241	0.493	MWD+SAG
2319.10	9.54	55.98	2296.38	139.93	96.46	153.50	0.328	-0.260	-1.187	MWD+SAG
2343.70	9.24	55.10	2320.65	142.20	99.77	157.50	0.406	-0.366	-1.073	MWD+SAG

Company: Talisman	Date: 10-05-2006	Time: 08:19:59	Page: 3
Field: Varg 15/12	Co-ordinate(NE) Reference:	Site: 15/12-16, Grid North	
Site: 15/12-16	Vertical (TVD) Reference:	RKB 39.5m 39.5	
Well: 15/12-16S	Section (VS) Reference:	Well (0.00N,0.00E,60.00Azi)	
Wellpath: 16-S Main Bore E2	Survey Calculation Method:	Minimum Curvature	Db: Oracle

Survey

MD m	Incl deg	Azim deg	TVD m	+N/-S m	+E/-W m	VS m	DLS deg/30m	Build deg/30m	Turn deg/30m	Tool/Comment
2377.50	8.54	54.62	2354.04	145.20	104.05	162.71	0.625	-0.621	-0.426	MWD+SAG
2406.90	8.46	52.21	2383.12	147.79	107.53	167.02	0.373	-0.082	-2.459	MWD+SAG
2435.90	8.43	52.99	2411.81	150.38	110.92	171.25	0.122	-0.031	0.807	MWD+SAG
2464.70	8.32	53.85	2440.30	152.88	114.29	175.41	0.174	-0.115	0.896	MWD+SAG
2493.50	9.85	65.92	2468.74	155.11	118.22	179.94	2.538	1.594	12.573	MWD+SAG
2521.90	12.33	78.80	2496.61	156.69	123.41	185.22	3.688	2.620	13.606	MWD+SAG
2550.20	15.12	78.25	2524.10	158.03	129.99	191.59	2.961	2.958	-0.583	MWD+SAG
2578.80	16.70	76.83	2551.61	159.73	137.64	199.07	1.707	1.657	-1.490	MWD+SAG
2607.80	18.19	74.51	2579.27	161.89	146.06	207.44	1.701	1.541	-2.400	MWD+SAG
2637.10	20.23	71.65	2606.94	164.70	155.28	216.83	2.300	2.089	-2.928	MWD+SAG
2666.50	22.53	71.36	2634.31	168.10	165.44	227.33	2.349	2.347	-0.296	MWD+SAG
2695.50	23.63	72.39	2660.99	171.64	176.25	238.45	1.212	1.138	1.066	MWD+SAG
2724.60	25.13	73.57	2687.50	175.15	187.73	250.16	1.626	1.546	1.216	MWD+SAG
2753.50	26.30	74.74	2713.53	178.57	199.80	262.32	1.324	1.215	1.215	MWD+SAG
2782.30	26.59	74.76	2739.32	181.95	212.17	274.72	0.302	0.302	0.021	MWD+SAG
2811.00	28.04	73.33	2764.82	185.57	224.83	287.49	1.664	1.516	-1.495	MWD+SAG
2825.70	27.57	73.51	2777.82	187.53	231.40	294.16	0.974	-0.959	0.367	9 5/8"
2854.80	27.90	73.40	2803.58	191.38	244.39	307.34	0.344	0.340	-0.113	MWD+SAG
2884.70	28.22	73.33	2829.96	195.41	257.86	321.02	0.323	0.321	-0.070	MWD+SAG
2913.30	28.49	73.31	2855.13	199.31	270.87	334.24	0.283	0.283	-0.021	MWD+SAG
2942.00	28.53	73.49	2880.35	203.22	284.00	347.56	0.099	0.042	0.188	MWD+SAG
2947.00	28.63	73.36	2884.74	203.90	286.29	349.89	0.707	0.600	-0.780	MWD+SAG
2961.00	28.63	73.36	2897.03	205.82	292.72	356.42	0.000	0.000	0.000	PROJECTED to TD

Casing Points

MD m	TVD m	Diameter in	Hole Size in	Name
186.90	186.90	30.000	36.000	30"
1312.70	1303.77	13.375	17.500	13-3/8" csg
2825.70	2777.82	9.625	12.250	9 5/8"

Company: Talisman	Date: 10-05-2006	Time: 08:19:46	Page: 1
Field: Varg 15/12	Co-ordinate(NE) Reference: Site: 15/12-16, Grid North		
Site: 15/12-16	Vertical (TVD) Reference: RKB 39.5m 39.5		
Well: 15/12-16S	Section (VS) Reference: Well (0.00N,0.00E,60.00Azi)		
Wellpath: 16-S Main Bore E2	Survey Calculation Method: Minimum Curvature	Db: Oracle	

Field: Varg 15/12 Norwegian Sea Norway	Map System: Universal Transverse Mercator	Map Zone: UTM Zone 31, North 0 to 6E
Geo Datum: ED50 (International 1924)	Coordinate System: Site Centre	
Sys Datum: Mean Sea Level	Geomagnetic Model: bggm2005	

Site: 15/12-16

Site Position:	Northing: 6432466.99 m	Latitude: 58 1 40.393 N
From: Map	Easting: 436472.16 m	Longitude: 1 55 27.968 E
Position Uncertainty: 0.00 m		North Reference: Grid
Water Depth: 87.00 m		Grid Convergence: -0.91 deg

Well: 15/12-16S	Slot Name:
Surface Position: +N/-S 0.00 m	Northing: 6432466.99 m
+E/-W 0.00 m	Easting: 436472.16 m
Position Uncertainty: 0.00 m	Latitude: 58 1 40.393 N
Reference Point: +N/-S 0.00 m	Longitude: 1 55 27.968 E
+E/-W 0.00 m	North Reference: Grid
	Grid Convergence: -0.91 deg
	Measured Depth: 126.50 m
	Inclination: 0.00 deg
	Azimuth: 0.00 deg

Wellpath: 16-S Main Bore E2	Drilled From: Well Ref. Point
Current Datum: RKB 39.5m	Tie-on Depth: 126.50 m
Magnetic Data: 16-02-2006	Above System Datum: Mean Sea Level
Field Strength: 50209 nT	Declination: -2.45 deg
Vertical Section: Depth From (TVD)	Mag Dip Angle: 71.35 deg
+N/-S m	+E/-W m
	Direction deg
126.50	0.00
	60.00

Survey Program for Definitive Wellpath

Date: 10-05-2006	Validated: No	Version: 9
Actual From m	To m	Survey
		Toolcode
		Tool Name
183.12	343.60	16S_Evader Gyro 17½" (183.12-3
362.40	1294.20	16S_MWD 17½" (362.40-1294.20)
1294.20	2825.70	16S_MWD 12¼" (1294.20-2825.70)
2854.80	2947.00	16S_MWD 8½" (2854.80-2947.00)
2961.00	2961.00	16S_Projected to TD (2961.00-2
		SDC NS Gyro
		MWD+SAG
		MWD+SAG
		MWD+SAG
		BLIND
		Northseeking Gyro
		MWD + Sag correction
		MWD + Sag correction
		MWD + Sag correction
		Blind drilling

Survey

MD m	Incl deg	Azim deg	TVD m	+N/-S m	+E/-W m	Map Northing m	Map Easting m	<---- Latitude ---->			<--- Longitude --->		
								Deg	Min	Sec	Deg	Min	Sec
126.50	0.00	0.00	126.50	0.00	0.00	6432466.99	436472.16	58	1	40.393 N	1	55	27.968 E
183.12	0.70	150.71	183.12	-0.30	0.17	6432466.69	436472.33	58	1	40.383 N	1	55	27.979 E
186.90	0.51	135.53	186.90	-0.33	0.19	6432466.66	436472.35	58	1	40.382 N	1	55	27.980 E
205.87	0.97	27.01	205.87	-0.25	0.32	6432466.74	436472.48	58	1	40.385 N	1	55	27.988 E
233.78	0.79	335.91	233.77	0.13	0.35	6432467.12	436472.51	58	1	40.397 N	1	55	27.990 E
256.57	1.76	306.30	256.56	0.49	0.01	6432467.48	436472.17	58	1	40.408 N	1	55	27.968 E
285.69	2.20	296.26	285.66	1.00	-0.85	6432467.99	436471.31	58	1	40.425 N	1	55	27.915 E
314.09	2.38	292.73	314.04	1.47	-1.89	6432468.46	436470.27	58	1	40.439 N	1	55	27.852 E
343.60	2.29	285.51	343.52	1.86	-3.02	6432468.85	436469.14	58	1	40.451 N	1	55	27.782 E
362.40	3.64	286.76	362.30	2.13	-3.95	6432469.12	436468.21	58	1	40.460 N	1	55	27.725 E
393.30	5.75	286.23	393.09	2.85	-6.38	6432469.84	436465.78	58	1	40.482 N	1	55	27.577 E
422.20	7.53	289.07	421.80	3.87	-9.56	6432470.86	436462.60	58	1	40.513 N	1	55	27.382 E
451.00	8.82	289.72	450.31	5.23	-13.42	6432472.22	436458.74	58	1	40.555 N	1	55	27.145 E
479.90	9.88	290.10	478.82	6.83	-17.84	6432473.82	436454.32	58	1	40.604 N	1	55	26.875 E
508.80	10.89	291.16	507.25	8.67	-22.71	6432475.66	436449.45	58	1	40.661 N	1	55	26.576 E
537.70	10.83	292.03	535.63	10.68	-27.77	6432477.67	436444.39	58	1	40.724 N	1	55	26.265 E
566.50	10.98	292.33	563.91	12.73	-32.82	6432479.72	436439.34	58	1	40.787 N	1	55	25.956 E
595.40	11.03	293.45	592.28	14.88	-37.90	6432481.87	436434.26	58	1	40.854 N	1	55	25.644 E
624.20	11.09	294.39	620.54	17.12	-42.95	6432484.11	436429.21	58	1	40.924 N	1	55	25.334 E
653.00	11.08	294.01	648.81	19.39	-48.00	6432486.38	436424.16	58	1	40.995 N	1	55	25.024 E

Company: Talisman	Date: 10-05-2006	Time: 08:19:46	Page: 2
Field: Varg 15/12	Co-ordinate(NE) Reference:	Site: 15/12-16, Grid North	
Site: 15/12-16	Vertical (TVD) Reference:	RKB 39.5m 39.5	
Well: 15/12-16S	Section (VS) Reference:	Well (0.00N,0.00E,60.00Azi)	
Wellpath: 16-S Main Bore E2	Survey Calculation Method:	Minimum Curvature	Db: Oracle

Survey

MD m	Incl deg	Azim deg	TVD m	+N/-S m	+E/-W m	Map Northing m	Map Easting m	<---- Latitude ---->			<--- Longitude --->		
								Deg	Min	Sec	Deg	Min	Sec
681.90	9.28	291.78	677.25	21.38	-52.70	6432488.37	436419.46	58	1	41.057 N	1	55	24.736 E
710.70	7.80	293.47	705.73	23.02	-56.65	6432490.01	436415.51	58	1	41.108 N	1	55	24.494 E
739.50	7.03	291.99	734.29	24.46	-60.08	6432491.45	436412.08	58	1	41.153 N	1	55	24.283 E
768.40	5.55	290.86	763.01	25.62	-63.02	6432492.61	436409.14	58	1	41.189 N	1	55	24.103 E
797.30	3.64	287.35	791.82	26.39	-65.21	6432493.38	436406.95	58	1	41.212 N	1	55	23.969 E
826.10	2.63	277.92	820.58	26.76	-66.73	6432493.75	436405.43	58	1	41.223 N	1	55	23.876 E
855.00	1.40	255.57	849.46	26.76	-67.73	6432493.75	436404.43	58	1	41.223 N	1	55	23.815 E
883.80	1.43	254.87	878.25	26.58	-68.42	6432493.57	436403.74	58	1	41.217 N	1	55	23.773 E
912.70	1.50	254.77	907.14	26.38	-69.13	6432493.37	436403.03	58	1	41.210 N	1	55	23.730 E
941.60	1.49	258.69	936.03	26.21	-69.87	6432493.20	436402.29	58	1	41.204 N	1	55	23.685 E
970.40	1.58	258.92	964.82	26.06	-70.62	6432493.05	436401.54	58	1	41.199 N	1	55	23.639 E
999.30	1.59	262.44	993.71	25.93	-71.41	6432492.92	436400.75	58	1	41.194 N	1	55	23.591 E
1028.00	1.52	266.86	1022.40	25.86	-72.19	6432492.85	436399.97	58	1	41.191 N	1	55	23.544 E
1056.80	1.32	21.42	1051.19	26.15	-72.45	6432493.14	436399.71	58	1	41.201 N	1	55	23.528 E
1085.70	3.50	44.01	1080.07	27.09	-71.71	6432494.08	436400.45	58	1	41.232 N	1	55	23.572 E
1114.60	5.98	48.60	1108.87	28.72	-69.97	6432495.71	436402.19	58	1	41.285 N	1	55	23.676 E
1143.40	8.24	53.67	1137.44	30.94	-67.18	6432497.93	436404.98	58	1	41.358 N	1	55	23.844 E
1172.30	10.74	60.83	1165.95	33.48	-63.16	6432500.47	436409.00	58	1	41.442 N	1	55	24.087 E
1201.10	11.05	62.49	1194.23	36.06	-58.37	6432503.05	436413.79	58	1	41.528 N	1	55	24.376 E
1230.00	11.18	64.37	1222.58	38.55	-53.39	6432505.54	436418.77	58	1	41.611 N	1	55	24.677 E
1258.80	10.99	65.51	1250.85	40.90	-48.37	6432507.89	436423.79	58	1	41.690 N	1	55	24.981 E
1287.70	11.02	66.30	1279.22	43.15	-43.34	6432510.14	436428.82	58	1	41.765 N	1	55	25.285 E
1294.20	10.89	65.88	1285.60	43.65	-42.21	6432510.64	436429.95	58	1	41.782 N	1	55	25.354 E
1312.70	10.88	64.38	1303.77	45.12	-39.04	6432512.11	436433.12	58	1	41.831 N	1	55	25.545 E
1338.20	10.87	62.30	1328.81	47.28	-34.74	6432514.27	436437.42	58	1	41.903 N	1	55	25.805 E
1368.20	11.25	60.39	1358.25	50.04	-29.69	6432517.03	436442.47	58	1	41.995 N	1	55	26.110 E
1397.20	11.35	59.78	1386.69	52.87	-24.77	6432519.86	436447.39	58	1	42.089 N	1	55	26.408 E
1426.10	10.37	55.14	1415.07	55.79	-20.17	6432522.78	436451.99	58	1	42.186 N	1	55	26.685 E
1454.50	9.77	52.75	1443.03	58.71	-16.16	6432525.70	436456.00	58	1	42.282 N	1	55	26.927 E
1483.40	9.59	55.46	1471.52	61.56	-12.22	6432528.55	436459.94	58	1	42.376 N	1	55	27.164 E
1511.80	9.13	54.17	1499.54	64.22	-8.45	6432531.21	436463.71	58	1	42.464 N	1	55	27.391 E
1540.60	8.87	53.42	1527.99	66.88	-4.81	6432533.87	436467.35	58	1	42.552 N	1	55	27.610 E
1569.40	8.48	52.63	1556.46	69.49	-1.34	6432536.48	436470.82	58	1	42.639 N	1	55	27.819 E
1597.90	8.42	52.86	1584.65	72.03	1.99	6432539.02	436474.15	58	1	42.722 N	1	55	28.020 E
1625.90	8.25	52.01	1612.35	74.50	5.21	6432541.49	436477.37	58	1	42.804 N	1	55	28.213 E
1655.20	9.02	52.63	1641.32	77.19	8.69	6432544.18	436480.85	58	1	42.893 N	1	55	28.423 E
1685.00	9.22	52.55	1670.75	80.06	12.44	6432547.05	436484.60	58	1	42.987 N	1	55	28.649 E
1713.90	9.13	51.56	1699.28	82.89	16.08	6432549.88	436488.24	58	1	43.081 N	1	55	28.867 E
1742.80	9.09	51.75	1727.81	85.73	19.67	6432552.72	436491.83	58	1	43.174 N	1	55	29.083 E
1771.30	9.60	52.15	1755.93	88.58	23.31	6432555.57	436495.47	58	1	43.268 N	1	55	29.303 E
1800.40	9.36	55.65	1784.64	91.41	27.18	6432558.40	436499.34	58	1	43.362 N	1	55	29.536 E
1829.40	9.15	55.07	1813.26	94.06	31.02	6432561.05	436503.18	58	1	43.449 N	1	55	29.767 E
1858.60	9.06	54.32	1842.09	96.73	34.79	6432563.72	436506.95	58	1	43.538 N	1	55	29.994 E
1887.20	8.99	54.05	1870.34	99.35	38.43	6432566.34	436510.59	58	1	43.624 N	1	55	30.213 E
1915.70	9.47	54.64	1898.47	102.02	42.14	6432569.01	436514.30	58	1	43.712 N	1	55	30.437 E
1944.30	9.78	53.26	1926.66	104.83	46.01	6432571.82	436518.17	58	1	43.805 N	1	55	30.670 E
1972.70	9.61	52.91	1954.66	107.70	49.83	6432574.69	436521.99	58	1	43.900 N	1	55	30.900 E
2001.80	9.55	53.15	1983.35	110.62	53.70	6432577.61	436525.86	58	1	43.996 N	1	55	31.133 E
2030.80	9.31	54.23	2011.96	113.43	57.53	6432580.42	436529.69	58	1	44.089 N	1	55	31.364 E
2060.00	9.20	54.93	2040.78	116.15	61.36	6432583.14	436533.52	58	1	44.179 N	1	55	31.594 E
2089.10	9.09	55.52	2069.51	118.79	65.15	6432585.78	436537.31	58	1	44.267 N	1	55	31.823 E
2117.80	9.07	55.83	2097.85	121.34	68.89	6432588.33	436541.05	58	1	44.351 N	1	55	32.049 E
2147.00	8.95	55.17	2126.69	123.93	72.66	6432590.92	436544.82	58	1	44.437 N	1	55	32.276 E
2176.20	8.81	55.04	2155.54	126.51	76.36	6432593.50	436548.52	58	1	44.522 N	1	55	32.499 E
2204.90	9.63	55.62	2183.87	129.13	80.14	6432596.12	436552.30	58	1	44.608 N	1	55	32.727 E
2233.50	10.08	56.46	2212.05	131.86	84.20	6432598.85	436556.36	58	1	44.699 N	1	55	32.971 E
2261.70	10.02	56.65	2239.82	134.57	88.31	6432601.56	436560.47	58	1	44.789 N	1	55	33.219 E
2290.30	9.79	57.12	2267.99	137.26	92.43	6432604.25	436564.59	58	1	44.878 N	1	55	33.468 E

Company: Talisman	Date: 10-05-2006	Time: 08:19:46	Page: 3
Field: Varg 15/12	Co-ordinate(NE) Reference:	Site: 15/12-16, Grid North	
Site: 15/12-16	Vertical (TVD) Reference:	RKB 39.5m 39.5	
Well: 15/12-16S	Section (VS) Reference:	Well (0.00N,0.00E,60.00Azi)	
Wellpath: 16-S Main Bore E2	Survey Calculation Method:	Minimum Curvature	Db: Oracle

Survey

MD m	Incl deg	Azim deg	TVD m	+N/-S m	+E/-W m	Map Northing m	Map Easting m	<---- Latitude ---->			<--- Longitude --->				
								Deg	Min	Sec	Deg	Min	Sec		
2319.10	9.54	55.98	2296.38	139.93	96.46	6432606.92	436568.62	58	1	44.966	N	1	55	33.711	E
2343.70	9.24	55.10	2320.65	142.20	99.77	6432609.19	436571.93	58	1	45.041	N	1	55	33.910	E
2377.50	8.54	54.62	2354.04	145.20	104.05	6432612.19	436576.21	58	1	45.140	N	1	55	34.168	E
2406.90	8.46	52.21	2383.12	147.79	107.53	6432614.78	436579.69	58	1	45.226	N	1	55	34.378	E
2435.90	8.43	52.99	2411.81	150.38	110.92	6432617.37	436583.08	58	1	45.311	N	1	55	34.582	E
2464.70	8.32	53.85	2440.30	152.88	114.29	6432619.87	436586.45	58	1	45.394	N	1	55	34.784	E
2493.50	9.85	65.92	2468.74	155.11	118.22	6432622.10	436590.38	58	1	45.468	N	1	55	35.022	E
2521.90	12.33	78.80	2496.61	156.69	123.41	6432623.68	436595.57	58	1	45.522	N	1	55	35.337	E
2550.20	15.12	78.25	2524.10	158.03	129.99	6432625.02	436602.15	58	1	45.568	N	1	55	35.736	E
2578.80	16.70	76.83	2551.61	159.73	137.64	6432626.72	436609.80	58	1	45.627	N	1	55	36.201	E
2607.80	18.19	74.51	2579.27	161.89	146.06	6432628.88	436618.22	58	1	45.701	N	1	55	36.712	E
2637.10	20.23	71.65	2606.94	164.70	155.28	6432631.69	436627.44	58	1	45.797	N	1	55	37.271	E
2666.50	22.53	71.36	2634.31	168.10	165.44	6432635.09	436637.60	58	1	45.912	N	1	55	37.887	E
2695.50	23.63	72.39	2660.99	171.64	176.25	6432638.63	436648.41	58	1	46.032	N	1	55	38.542	E
2724.60	25.13	73.57	2687.50	175.15	187.73	6432642.14	436659.89	58	1	46.152	N	1	55	39.239	E
2753.50	26.30	74.74	2713.53	178.57	199.80	6432645.56	436671.96	58	1	46.268	N	1	55	39.971	E
2782.30	26.59	74.76	2739.32	181.95	212.17	6432648.94	436684.33	58	1	46.384	N	1	55	40.721	E
2811.00	28.04	73.33	2764.82	185.57	224.83	6432652.56	436696.99	58	1	46.507	N	1	55	41.489	E
2825.70	27.57	73.51	2777.82	187.53	231.40	6432654.52	436703.56	58	1	46.574	N	1	55	41.888	E
2854.80	27.90	73.40	2803.58	191.38	244.39	6432658.37	436716.55	58	1	46.705	N	1	55	42.675	E
2884.70	28.22	73.33	2829.96	195.41	257.86	6432662.40	436730.02	58	1	46.842	N	1	55	43.493	E
2913.30	28.49	73.31	2855.13	199.31	270.87	6432666.30	436743.03	58	1	46.975	N	1	55	44.282	E
2942.00	28.53	73.49	2880.35	203.22	284.00	6432670.21	436756.16	58	1	47.108	N	1	55	45.078	E
2947.00	28.63	73.36	2884.74	203.90	286.29	6432670.89	436758.45	58	1	47.132	N	1	55	45.217	E
2961.00	28.63	73.36	2897.03	205.82	292.72	6432672.81	436764.88	58	1	47.197	N	1	55	45.607	E

Casing Points

MD m	TVD m	Diameter in	Hole Size in	Name
186.90	186.90	30.000	36.000	30"
1312.70	1303.77	13.375	17.500	13-3/8" csg
2825.70	2777.82	9.625	12.250	9 5/8"

11.8 and 11.9 Clean-Up and Completion Fluids Report

COMPLETION Fluids

The well was displaced to inhibited seawater prior to the completion operations. The seawater was inhibited with Caustic Soda (corrosion inhibitor), Barascav L (Oxygen Scavenger) and Dyno scale inhibitor.

CLEAN OUT

Completion activities started on May 4th 2005 at 14:30 when rigging up 2 7/8" running equipment.

The 5 1/2" clean-out string was run on 2 7/8" drill pipe. It was crossed over to 5 1/2" drill pipe, and 9 5/8" clean-out string run. The BOP jetting tool was installed and BOP washed when running in.

Packer area was scraped and PBR dressed before displacing well and pumping wash pills. The well was washed and cleaned according to programme, and a NTU reading of 105 was achieved before displacing well to inhibited seawater (completion fluid).

The well was flow checked and clean-out string pulled out of hole

The wear bushing was retrieved and a wellhead/BOP washed using SPS Int. jetting tool and well patroller. Found large amounts of debris in well patroller when dis-assembling tool onshore.

11.10 Perforation Record

11.10 Perforation

Perforation intervals (log depths): 2849.0 m – 2884.0 m MD RKB.

Ran in hole with tool string (GR-CCL) on wireline, correlated test string depth according to perforation interval. Spaced out test string, ran in hole and sat 7" retrievable packer.

From the open hole logging results, a 33.6 meters of RZ1 was selected for perforation. TCP guns deployed on the bottom of the DST string were configured to perforate this zone.

With the DST string in position, the seawater in the string above the OMNI circulation valve was displaced to base oil in order to achieve a suitable under balance of ca 35 bar. The OMNI valve was cycled to the well test position by applying 80 bar to the annulus.

The tubing was pressured up to 325 bar to shear the pins within the TDF firing head and initiate the detonation sequence. Pressure was bled back to 15 bar at the PWS choke to provide a 35 bar under balance prior to perforating.

The 7" liner was then perforated using 4 5/8" 12spf HMX Millenium TCP guns. After a 15 min delay, there was a positive indication of the guns firing with tubing head pressure increase to 47 bar.

After firing, the gun assembly was configured to allow flow via ported pup joint situated above the guns.

The well was opened up on a small adjustable choke. A total of 6.6 m3 base oil was flowed into the surge tank. The well was left shut in at the PWS choke manifold for an extend period to allow PWS time to complete their rig up prior to cleaning up the well.

All guns confirmed fired after pulling the test string.

11.12 Cuttings Handling Report

Cuttings and Swarf Handling

15/12-16 S Well Operation

Swarf Handling

No milling/cutting operations performed in 15/12-16 S. No swarf reported.

Cuttings Handling

Due to the vertical design of the well, only the use of water based mud was planned. Oil based mud was planned for in case of a sidetrack (not done). Due to the potential sidetrack, a cutting handling facility (ship & skip) was set up for stand by.

Due to the use of water based mud, no cuttings injections or cuttings transport operations were performed. All generated cuttings discharged to sea.

12.0 Lessons Learned

Experience report

Search criteria:

Code Word 1: Planning

Code Word 2:

Code Word 3:

Company: Operator

Importance: High

Person: Torleif Helg

Valid for planning:

☐

Positive/Negative:

Negativ

Well: 15/12-16S (V **Field:** 038 - Varg

<i>Date</i>	<i>DB id:</i>	<i>Section</i>	<i>Operation</i>	<i>Problem</i>	<i>Recommendation</i>
1930-03-06	424	12 1/4"	Cementing	Maersk Giant Varg South 15/12-16S Deviation from Norsok D-010 Barrier Acceptance. 9 5/8" casing cementation TOC <100m above shallowest HC bearing formation (Ekofisk). Planned TOC behind the 9 5/8" casing was 200m above prognosed shallowest HC in Ekofisk formation. DSi log was run to verify the TOC when signs of HC were seen whilst drilling the 12 1/4" hole section (gas readings only). No oil shows were observed on the cuttings. TOC was measured at 2263m with top Ekofisk at 2454m, however the quality of cement down to 2450m is interpreted as 'patchy'	Worst case consequence is the build up of pressure and possibly HC in the 9 5/8" x 13 3/8" annulus during suspension / field life. The well was designed with cement and a mechanical pack-off to isolate the HC bearing zones behind the casing. Although 191m of cement is present, the quality of the cement is not as planned. A remedial cement squeeze would compromise the integrity of the 9 5/8" casing, and the effectiveness can not be guaranteed. The barite settling out of the 1.59sg water based mud behind the casing is expected to provide a further barrier. Other than a gas peak, there are no other indication of mobile HC in the Ekofisk. The flow potential has not been established but is expected to be minimal. On Varg Mian offset wells, where HC are confirmed in the Ekofisk, no pressure build up has been observed to date in the 9 5/8" x 13 3/8" annulus. When the 15/12-16S is tied back the pressure in the annulus will be verified with full well control equipment installed. In the event of pressure build up, an appropriate remedial plan will be implemented.

Search criteria:

Code Word 1: Casing/liner/tubi
Code Word 2: Wellhead/Casin
Code Word 3:

Company: Undefined
Importance: Medium
Person: Erik Tveit

Valid for planning:
Positive/Negative:

☐
Negativ

2001-04-06	397	P&A	P&A	Incident: The MLH (mudline hanger) running tool was planned to be released with a spear, and casing pulled to surface in the same operation. The spear slipped, and it was necessary to run the torque tool to release the MLH running tool from the MLH. When pulling out with the 9 5/8" surface casing after releasing MLH running tool with 11 RH turns, the MLH running tool was not attached to the casing. When rotating free the MLH running tool with the torque tool, the connection above had been backed out at the same time. Background: - The surface hanger running tool was not onboard. - Attempted to pull and release with an inline spear, but the spear was wrongly dressed from shore (friction blocks dressed for 10 3/4"), and could not be used. - Attempted to pull and release the MLH running tool with an Itco spear, but the spear slipped (had 3 – 10 T overpull, when spear released at 20 – 25 kft-lbs), and was not able to release. - The 9 5/8" Pos-grip surface hanger was released on the wellhead prior to retrieving casing. This should enable the casing string to rotate in the wellhead. - Vam Top connections on casing joints, but New Vam on top of MLH running tool. Causes: Main causes 1. ☐ The connection above the MLH running tool backed out when releasing MLH running tool from the MLH using the torque tool with RH rotation (11 - 12 turns, torque 10 – 12 kft-lbs. A max. torque peak of 19 kft-lbs observed. Had to pick slightly up to re-balance the string weight). Underlying causes: 1. ☐ Did not have handling tool for surface hanger, or a spear that could be rotated with onboard. Had to use the torque tool to release the MLH running tool. 2. ☐ Connection on top of MLH running tool not made properly	Immediate actions: 1. ☐ Ran in with a spear to fish MLH running tool. Not able to release at first. 2. ☐ Ran torque tool several times to check that MLH running tool was free to rotate. Last time the torque tool was run without the locating dogs to avoid the MLH running tool stalling out / jamming when it is raised and forced into the edge of the locating dogs on the torque tool. Spear was also run several times in attempts to free the MLH running tool. 3. ☐ Finally managed to pull the MLH running tool with 6 T overpull and 20 kft-lbs using an inline spear. After 3 revolutions with high torque, it came free. Recommended actions: 1. ☐ Avoid using torque tool, if possible, to release MLH running tool when pulling 9 5/8" surface casing. It is not possible to observe if the casing rotates, or if it is being backed out above the MLH running tool. 2. ☐ Evaluate different means for fishing a MLH running tool. The running tool is only 68 cm, and the slips segments on the inline spear used on this job was 39 cm. Not much room to play with. An Itco spear could not have done the job, due to the high torque required. 3. ☐ The surface casing handling tool should always be onboard. Even if it is not used for pulling with, it is to be used as handling joint for the surface hanger. 4. ☐ When using the torque tool, and the depth to the rotating profile is known exactly (i.e. after the first run with the torque tool), it should be evaluated to take off the locating dogs. This to avoid the MLH running tool to be forced upwards into the shoulder on the locating dogs when being rotated out. It can be difficult to balance the string weight exactly and avoid that to happen, when the locating dogs installed.
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Search criteria:

Code Word 1: Casing/liner/tubi
Code Word 2: Wellhead/Casin
Code Word 3:

Company: Undefined
Importance: Medium
Person: Erik Tveit

Valid for planning:
Positive/Negative:

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up?

3. ☐ Difficult to balance the string weight with the torque tool.
 This could cause the threads to jam when the MLH running tool is lifted and takes weight on the locating dogs on the torque tool.

4. ☐ Not able to visually see if the 9 5/8" casing is rotating while rotating the torque tool.

2002-04-06	392	P&A	P&A	When pulling surface casing strings (9 5/8" and 13 3/8") with a spear and not using the surface hanger running tool, it must be supplied a manual side door elevator for these dimensions. In this case it was not ordered out.	Mobilized the surface hanger running tools and used them instead of a spear.
2002-04-06	391	P&A	Casing	It is not necessary to use a slips when using C-plate for running conductor (Master ring removed due to Lynx connector). It is still possible to use 2 ea 30" elevators as we normally do.	
2005-07-30	18	P&A	Planning	Do not use a split shot type tubing cutter on vam-ace or any tubing with a negative angle on the thread Test	Use a radial type cutter
2006-02-10	380	> 32"	Casing	Missing pup to put on top of 30" circulating swage in order to handle 30" joint with swage efficiently	Plan to have 1m pup to put on top of swage.
2006-02-10	381	> 32"	Casing	When running conductor c-plate and hinged bowl were used in order to get the Lynx connector through rotary. In order to get the conductor connection through the bowl, it had to be open and closed for every connection.	Supply bowl with large enough ID to get 30" conductor connection through. OD of connection is: 32.25".
2006-02-11	383	> 32"	Cementing	Approx. 3 hours after the conductor had been cemented it was observed (water) flow on the outside of the conductor. The flow stopped after approx. 6 hours. It was now possible to see a big crater plus it was possible to see 4-5 m down below the Lynx connector. Some horizontal movement of the conductor were also observed.	Groutining. Time for the grouting will be dependent on what is experienced as the operation proceeds.
2006-02-25	387	17 1/2"	Casing	When picking up the backup 13 3/8" surface casing hanger, the stabilizer had to be changed over from the primary. This caused rig time.	There should be a centralizer pre-installed on the backup assembly also. ****Plexus to be inserted as service company for this experience*****
2006-02-26	386	17 1/2"	Casing	Could not use the IRN to make up the 5 1/2" x 13 3/8" circulating swage due to fish neck to short (only 19 cm).	The fish neck on equipment should be minimum 30 cm to allow for making up with the IRN.

Search criteria:**Code Word 1:** Maintenance**Code Word 2:** Logistics**Code Word 3:****Company:** Maersk Drill**Importance:** High**Person:** Knut Jarlsb**Valid for planning:****Positive/Negative:**

Negativ

2006-03-10	384	12 1/4"	Drilling	During drilling of the 12 1/4" section the 2,28 m 4" jumper hose on the topdrive bursted. This resulted in pulling out of the hole inside the 13 3/8" casing and performed the replacement if the hose. MCN did not have a back up jumper hose on bord the rig. Had to mobilize a 4" chicksan replacement. This incident resulted in a total of 21,5 hours of downtime.	MCN to do a RCM analasis on all critical maintainance and prepare stock of all critical items found in the RCM analasis.
2006-03-12	385	8 1/2"	Drilling	After having performed a FIT to 1.20 sg with 1.09 sg mud the 8 1/2" section was drilled. Experienced very high ECD while drilling 1.22 sg to 1.28 sg. The reason for the high ECD is not clear, but a contribution factor is the usage of 8 ea 6 3/4" DC in the BHA, and a very high rheology on the water based mud. 3 rpm reading of 10 and a yield point of 18 Pa. With a longer well and in a situation with smaller "work window" (difference between pore pressure and fractuation pressure) this could easily resulted in break down of the formation	Optimize the BHA design to reduce the amount of DCs to lighten the BHA and reduction of the ECD. It is also important to have a optimized rheology profile of the water based mud system (Baradril N) to ensure proper hole cleaning and a managable ECD for the actual well. For a simular waterbased system Aquadril with 1.38 sg MW the 3 rpm reading was 5-7 and YP 10 -12 Pa.
2006-03-30	388	P&A	Planning	Wear bushing running tool (9 5/8") came out without extension sub. Ironroughneck could (AR 4500) could not make it up, manual tongs had to be used to make up the connection.	Make up wear bushing running tool onshore so its possible for ironroughneck to make it up offshore. Note: service company: Plexus, not IKM!
2006-03-31	389	P&A	Casing	The 9 5/8" inline spear was dressed with 10 3/4" friction blocks. This again made it impossible to pass through the wellhead area. Had to pull out of hole and prepare new 9 5/8" spear.	More focus onshore when making up spears.
2012-02-06	395	P&A	P&A	It is difficult to keep a neutral weight when using Plexus torque tool to unscrew the MLH running tool. If there is any weight down (locating dogs on torque tool landing off in profile) it is difficult to unscrew the running tool due to high torque on threads.	Removed locating dogs (3) on torque tool before runing it. This can be done when the depth to the profile is known exactly (ie after having done one run with locating dogs installed). This resulted in much lower torque when releasing MLH running tool.

Search criteria:

Code Word 1: Casing/liner/tubi
Code Word 2: Wellhead/Casin
Code Word 3:

Company: Undefined
Importance: Medium
Person: Erik Tveit

Valid for planning:
Positive/Negative:

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Negativ

2012-02-06	396	17 1/2"	Casing	Incident: Backed out the 13 3/8" casing, when attempting to release surface hanger running tool. Driller applied 1200 ft-lb (left hand torque) to casing string with a manual casing tong. This was the torque expected for releasing the surface hanger running tool. When the landing string and the surface hanger running tool was pulled to surface, the surface hanger was still made up to the running tool. The 13 3/8" casing had backed off one joint below the surface hanger assembly. Pulled out and laid out the primary casing hanger and the joint below. Ran in with a spear and engaged to the casing. Released the MLH running tool from the MLH and pulled out with the casing. Checked all the connection on the way out (break out torque 18 – 20 kft-lb, and the mark on the Buttress connections were from 75% to 100% buried) Background: - Casing joints doped onshore. - The first 10 joints of casing (Buttress connections) were run to the mark, to obtain an average torque value. This was found to be 10 kft-lb. - No problems experienced during running of casing. Casing string not worked in any way, to get down to depth. - The last 5 joints prior to the MLH, and all the joints above, should according to the programme be made up to 12 kft-lb. - Service broke the surface casing hanger running tool from the casing hanger (1 kft-lb). It was made up again to the markup line prior to running assembly. When the casing was re-run, it was attempted to service break this hanger again, but did not break with 5 kft-lb. - After landing the casing in the MLH, the casing was cemented in place, the plug bumped and casing pressure tested to 210 bar for 10 minutes. - The Plexus torque tool was run inside the 13 3/8" casing and landed in its profile in the MLH. Opened the wash ports with 8 turns to the right. Circulated out cement above the MLH and closed the wash ports with 8 turns to the left. The casing was then again successfully pressure tested to 210 bar. No anomalies observed during these operations. A cement head with quick latch was used for circulating and pressure testing.	Immediate actions: 1. Pulled out with landing string, surface casing hanger and casing to observe where the casing had backed off. 2. Mobilized fishing equipment, and retrieved remaining casing down to MLH (released MLH running tool). Checked all connections on the way out Recommended actions: 1. Check torque required to break out primary surface hanger running tool from hanger. 2. Evaluate need of torque-turn computer.
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Search criteria:

Code Word 1: Casing/liner/tubi
Code Word 2: Wellhead/Casin
Code Word 3:

Company: Undefined
Importance: Medium
Person: Erik Tveit

Valid for planning:
Positive/Negative:

☐
Negativ

Cause:
Unknown at the moment, but can be explained with this
specific connection not made up as it should.

APPENDIX A

T A L I S M A N		CUTTING DESCRIPTION				
E N E R G Y						
Well : 15/12-16 S		Area: North Sea		Country: Norway	Field: Varg South	
		Company: Talisman, Petoro				
		Geologist: A.Scholze, G.Bowes, J.Patel, D.Tinsley			Date: 15 Feb – 12 Mar 2006	
Depth M MDBRT	Lith. %	LITHOLOGY Rock, mod.lith, colour, grain size, sorting, roundness, surface features, hardness, fissility, matrix, cementation, sedimentary structures, accessories, fossils, porosity, contam.			Calci- metry Ca/ Mg	REMARKS Shows, cavings, mud additives
Hole: 17 ½"						
215	70	CLAYSTONE: pale greenish grey, pale grey, soft to firm, blocky, slightly silty in places, moderately calcareous, rare shell fragments.				
	30	SAND: loose quartz grains, clear, translucent, rarely white, medium to course, angular to sub-angular, sub-round, poorly sorted.				
220	80	SAND: loose quartz grains, clear, translucent, rarely white, medium to course, occasionally fine, angular to sub-angular, sub-round, poorly sorted				230 missed due to high ROP
	20	CLAYSTONE: predominantly pale grey, pale greenish grey, pale grey, soft to firm, blocky, slightly silty in places, moderately calcareous, rare shell fragments.				
240	100	SAND: loose quartz grains, clear, translucent, rarely white, medium to course, occasionally fine, angular to sub-angular, sub-round, poorly sorted				
250	90	SAND: loose quartz grains, clear, translucent, fine to medium, occasionally course, sub-angular, sub-round, poorly sorted.				
	10	CLAYSTONE: pale grey, pale greenish grey, soft to firm, blocky, moderately calcareous, rare shell fragments.				
260	70	SAND: loose quartz grains, clear, translucent, fine to medium, occasionally course, sub-angular, sub-round, poorly sorted.				
	30	CLAYSTONE: pale grey, pale greenish grey, soft to firm, blocky, moderately calcareous, rare shell fragments.				
270	100	SAND: loose quartz grains, clear, translucent, fine to medium, occasionally course, sub-angular, sub-round, poorly sorted. abundant black carbonaceous specks (mud additives ?)				
	Tr	CLAYSTONE: pale grey, pale greenish grey, soft to firm, blocky, moderately calcareous, rare shell fragments.				
280	70	CLAYSTONE: very pale grey, rare pale greenish grey, soft to firm, blocky, moderately calcareous, slightly silty in places, rare shell fragments.				
	30	SAND: loose quartz grains, clear, translucent, fine to medium, occasionally course, sub-angular, sub-round, poorly sorted, occasionally very fine/silty.				
290	80	SAND: loose quartz grains, clear, translucent, fine to medium, occasionally course, sub-angular, sub-round, poorly sorted, occasionally very fine/silty.				
	20	CLAYSTONE: very pale grey, rare pale greenish grey, soft to firm, blocky, moderately calcareous, slightly silty in places, rare shell fragments.				
300	90	SAND: loose quartz grains, transparent, translucent, occasionally white, sub-angular to angular, sub-spherical, moderately sorted.				
	10	CLAYSTONE: medium dark grey, abundant dark grey/black carbonaceous cuttings (possible mud additive?), soft to firm, sub-round to sub-blocky, moderately calcareous, trace microfossils				
310	90	SAND: loose quartz grains, transparent, translucent, occasionally white, sub-angular to angular, sub-spherical, moderately sorted.				
	10	CLAYSTONE: medium dark grey, abundant dark grey/black carbonaceous cuttings (possible mud additive?), soft to firm, sub-round to sub-blocky, moderately calcareous, trace microfossils, occasional very calcareous white to off white calcareous cuttings with a mudstone texture.				
320	60	SAND: loose quartz grains, transparent, translucent, white in parts, stained orange/brown in parts, fine to coarse grained, sub-angular to angular, subspherical, poorly sorted.				
	40	CLAYSTONE: medium dark grey, abundant dark grey/black carbonaceous cuttings (possible mud additive?), soft to firm, sub-round to sub-blocky, moderately calcareous, trace microfossils, occasional very calcareous white to off white calcareous cuttings with a mudstone texture.				

330	100	SAND: loose quartz grains, transparent, translucent, fine to coarse grained, sub-rounded to sub-angular, poorly sorted.	
	Tr	CLAYSTONE: medium dark grey, abundant dark grey/black carbonaceous cuttings (possible mud additive?), soft to firm, sub-round to sub-blocky, moderately calcareous, trace microfossils, occasional very calcareous white to off white calcareous cuttings with a mudstone texture.	
340	100	SAND: loose, transparent, translucent, fine to medium grained, occasionally coarse grained, sub-rounded to sub-angular, moderately sorted.	
	Tr	CLAYSTONE: medium dark grey, medium dark greenish grey, soft to firm, sub-round to sub-blocky, moderately calcareous, trace shell fragments.	
350	100	SAND: loose, transparent, translucent, fine to medium grained, occasionally coarse grained, sub-rounded to sub-angular, moderately sorted.	
	Tr	CLAYSTONE: medium dark grey, medium dark greenish grey, soft to firm, sub-round to sub-blocky, moderately calcareous, trace shell fragments.	
360	60	SAND: loose, transparent, translucent, fine to medium grained, occasionally coarse grained, sub-rounded to sub-angular, moderately sorted.	Noticeable increase in claystone cuttings.
	40	CLAYSTONE: predominantly brownish grey, soft to firm, sub-blocky, moderately calcareous, occasional to common fine black argillaceous or carbonaceous streaks/micro-laminations, trace fossils, trace shell fragments.	
370	60	CLAYSTONE: medium to dark grey, soft, amorphous to sub-round, sub-blocky, common to abundant loose quartz grains in grey argillaceous matrix, sandy/silty cuttings, non calcareous.	
	40	SAND: loose, transparent, translucent, fine to medium grained, occasionally coarse grained, sub-rounded to sub-angular, moderately sorted, commonly occurring in a soft, amorphous argillaceous matrix giving a very silty appearance.	
380	60	CLAYSTONE: medium to dark grey, soft, amorphous to sub-round, sub-blocky, common to abundant loose quartz grains in grey argillaceous matrix, very sandy/silty cuttings, non calcareous.	
	40	SAND: loose, transparent, translucent, fine to medium grained, occasionally coarse grained, sub-rounded to sub-angular, moderately sorted, commonly occurring in a soft, amorphous argillaceous matrix giving a very silty appearance.	
390	60	CLAYSTONE: medium to dark grey, soft, amorphous to sub-round, sub-blocky, common to abundant loose quartz grains in grey argillaceous matrix, very sandy/silty cuttings, non calcareous, trace shell fragments.	
	40	SAND: loose, transparent, translucent, fine to medium grained, occasionally coarse grained, sub-rounded to sub-angular, moderately sorted, commonly occurring in a soft, amorphous argillaceous matrix giving a very silty appearance.	
400	90	CLAYSTONE: medium to dark grey, very soft, amorphous, sticky, silty appearance in parts.	
	10	SAND: loose, transparent, translucent, fine to medium grained, occasionally coarse grained, sub-rounded to sub-angular, moderately sorted, commonly occurring in a soft, amorphous argillaceous matrix giving a very silty appearance.	
410	60	CLAYSTONE: medium to dark grey, soft, amorphous to sub-round, sub-blocky, common to abundant loose quartz grains in grey argillaceous matrix, very sandy/silty cuttings, non calcareous, trace shell fragments.	
	40	SAND: loose, transparent, translucent, fine to medium grained, occasionally coarse grained, sub-rounded to sub-angular, moderately sorted, commonly occurring in a soft, amorphous argillaceous matrix giving a very silty appearance.	
420	70	CLAYSTONE: medium to dark grey, soft, amorphous to sub-round, sub-blocky, common to abundant loose quartz grains in grey argillaceous matrix, very sandy/silty cuttings, non calcareous, trace shell fragments.	
	30	SAND: loose, transparent, translucent, fine to medium grained, occasionally coarse grained, sub-rounded to sub-angular, moderately sorted, commonly occurring in a soft, amorphous argillaceous matrix giving a very silty appearance.	
430	90	CLAYSTONE: medium to dark grey, soft, amorphous to sub-round, sub-blocky, common to abundant loose quartz grains in grey argillaceous matrix, very sandy/silty cuttings, non calcareous, trace shell fragments.	
	10	SAND: loose, transparent, translucent, fine to medium grained, occasionally coarse grained, sub-rounded to sub-angular, moderately sorted, commonly occurring in a soft, amorphous argillaceous matrix giving a very silty appearance.	

440	60	CLAYSTONE: medium to dark grey, soft, amorphous to sub-round, sub-blocky, common to abundant loose quartz grains in grey argillaceous matrix, very sandy/silty cuttings, non calcareous, trace shell fragments.	
	40	SAND: loose, transparent, translucent, fine to medium grained, occasionally coarse grained, sub-rounded to sub-angular, moderately sorted, commonly occurring in a soft, amorphous argillaceous matrix giving a very silty appearance.	
450	60	CLAYSTONE: medium to dark grey, soft, amorphous to sub-round, sub-blocky, common to abundant loose quartz grains in grey argillaceous matrix, very sandy/silty cuttings, non calcareous, trace shell fragments.	
	40	SAND: loose, transparent, translucent, fine to medium grained, occasionally coarse grained, sub-rounded to sub-angular, moderately sorted, commonly occurring in a soft, amorphous argillaceous matrix giving a very silty appearance.	
460	70	CLAYSTONE: medium to dark grey, soft, amorphous to sub-round, sub-blocky, common to abundant loose quartz grains in grey argillaceous matrix, very sandy/silty cuttings, non calcareous, trace shell fragments.	
	30	SAND: loose, transparent, translucent, fine to medium grained, occasionally coarse grained, sub-rounded to sub-angular, moderately sorted, commonly occurring in a soft, amorphous argillaceous matrix giving a very silty appearance.	
470	-		Missed sample
480	70	CLAYSTONE: medium dark grey, very soft, sticky, amorphous, sandy, silty, common shell fragments, trace mica, trace pyrite.	
	30	SAND: loose, transparent, translucent, fine to medium grained, occasionally coarse grained, sub-rounded to sub-angular, moderately sorted, commonly occurring in a soft, amorphous argillaceous matrix giving a very silty appearance.	
490	100	SAND: loose quartz grains, transparent, translucent, generally sub-angular, occasionally sub-round, moderate sphericity, sub-spherical, moderately sorted.	
	Tr	CLAYSTONE: medium dark grey, very soft, sticky, amorphous, sandy, silty, abundant shell fragments and microfossils, trace mica, common pyrite.	
500	70	CLAYSTONE: medium to dark grey, very soft, sticky, amorphous to sub-round, very sandy/silty cuttings, trace mica, common pyrite, trace shell fragments, trace microfossils.	
	30	SAND: loose quartz grains, transparent, translucent, fine to medium grained, occasional coarse grains, generally sub-angular, occasionally sub-round, moderate sphericity, sub-spherical, moderately sorted.	
510	80	CLAYSTONE: medium to dark grey, very soft, sticky, amorphous to sub-round, very sandy/silty cuttings, trace mica, common pyrite, trace shell fragments, trace microfossils.	
	20	SAND: loose quartz grains, transparent, translucent, fine to medium grained, occasional coarse grains, generally sub-angular, occasionally sub-round, moderate sphericity, sub-spherical, moderately sorted.	
520	80	CLAYSTONE: medium to dark grey, very soft, sticky, amorphous to sub-round, very sandy/silty cuttings, trace mica, common pyrite, trace shell fragments, trace microfossils.	
	20	SAND: loose quartz grains, transparent, translucent, fine to medium grained, occasional coarse grains, generally sub-angular, occasionally sub-round, moderate sphericity, sub-spherical, moderately sorted.	
530	90	CLAYSTONE: light to medium grey, soft to firm, sticky, blocky, silty in places, trace carbonaceous specks, moderately calcareous.	
	10	SAND: loose quartz grains, clear, transparent, translucent, fine to medium grained, generally sub-angular, sub-round, sub-spherical, poor to moderately sorted.	
540	90	CLAYSTONE: light to medium grey, soft to firm, sticky, blocky, silty in places, trace carbonaceous specks, moderately calcareous.	
	10	SAND: loose quartz grains, clear, transparent, translucent, fine to medium grained, generally sub-angular, sub-round, sub-spherical, poor to moderately sorted.	
550	100	CLAYSTONE: predominantly, light grey, soft to firm, sticky, blocky, silty in places, trace carbonaceous specks, moderately calcareous.	
	Tr	SAND: loose quartz grains, clear, transparent, translucent, fine to medium grained, generally sub-angular, sub-round, sub-spherical, poor to moderately sorted.	
560	100	CLAYSTONE: light to medium grey, soft to firm, sticky, blocky, silty in places, trace carbonaceous specks, moderately calcareous.	

	Tr	SAND: quartz, fine to medium, translucent, sub-angular, sub-round, sub-spherical, poor to moderately sorted.	
570	100	CLAYSTONE: light to medium grey, soft to firm, sticky, blocky, silty in places, trace carbonaceous specks, moderately calcareous.	
580	100	CLAYSTONE: light to medium grey, soft to firm, sticky, blocky, silty in places, trace carbonaceous specks, moderately calcareous.	
	Tr	SAND: loose quartz grains, clear, transparent, translucent, fine to medium grained, generally sub-angular, sub-round, sub-spherical, poor to moderately sorted.	
600	100	CLAYSTONE: light to medium grey, rare greenish grey, soft to firm, sticky, blocky, silty in places, trace carbonaceous specks, rare glauconite, moderately calcareous.	
610	100	CLAYSTONE: light to medium grey, occasionally off whitish soft cuttings, soft to firm, sticky, blocky, silty in places, moderately calcareous.	
620	Tr		
	100	CLAYSTONE: light to medium grey, rare greenish grey, soft to firm, sticky, blocky, silty in places, trace carbonaceous specks, moderately calcareous.	
630	100	CLAYSTONE: light to off whitish grey, rare greenish grey, soft to firm, sticky, blocky, silty in places, trace carbonaceous specks, moderately calcareous.	
640	100	CLAYSTONE: medium grey, soft, very sticky, amorphous, blocky, silty in places, trace carbonaceous specks, moderately calcareous.	
650	100	CLAYSTONE: medium grey, soft, very sticky, amorphous, blocky, silty in places, trace carbonaceous specks, moderately calcareous.	
660	100	CLAYSTONE: medium grey, homogenous, very soft, very sticky, amorphous, blocky, silty in places, trace carbonaceous specks, moderately calcareous.	
670	100	CLAYSTONE: medium grey, soft, very sticky, amorphous, blocky, slightly sandy in places, trace carbonaceous specks, moderately calcareous.	
680	100	CLAYSTONE: medium grey, rarely light grey, soft, very sticky, amorphous, blocky, slightly sandy in places, trace carbonaceous specks, moderately calcareous.	
690	100	CLAYSTONE: medium grey, soft, very sticky, amorphous, blocky, slightly sandy in places, trace carbonaceous specks, moderately calcareous.	
700	100	CLAYSTONE: medium grey, homogenous, soft, very sticky, amorphous, blocky, slightly sandy in places, trace carbonaceous specks, moderately calcareous.	
710	100	CLAYSTONE: medium grey, very soft, very sticky, blocky, slightly sandy in places, trace carbonaceous specks, moderately calcareous.	
730	100	CLAYSTONE: medium grey, very soft, very sticky, blocky, slightly sandy in places, trace carbonaceous specks, moderately calcareous	Missed 720m due to high ROP.
740	100	CLAYSTONE: medium grey, very soft, very sticky, blocky, slightly sandy in places, trace carbonaceous specks, moderately calcareous.	
750	100	CLAYSTONE: medium grey, homogenous, very soft, rarely firm, very sticky, pasty texture, calcareous, locally very silty.	
760	100	CLAYSTONE: medium grey, homogenous, very soft, very sticky, pasty texture, calcareous, locally very silty.	
780	100	CLAYSTONE: medium grey, homogenous, very soft, very sticky, pasty texture, calcareous, locally very silty.	
800	90	CLAYSTONE: light to medium grey, soft to firm, occasionally very soft, very sticky, pasty texture, calcareous, locally very silty.	Missed 790m due to high ROP.
	10	SAND: loose quartz, clear, translucent, fine to medium, sub angular, sub round to round, poor to moderately sorted.	
810	90	CLAYSTONE: light to medium grey, soft to firm, occasionally very soft, very sticky, pasty texture, calcareous, locally very silty.	
	10	SAND: loose quartz, clear, translucent, fine to medium, sub angular, sub round to round, poor to moderately sorted.	
820	100	CLAYSTONE: light to medium grey, soft to firm, occasionally very soft, very sticky, pasty texture, calcareous, locally very silty, grading to siltstone in parts.	
830	100	CLAYSTONE: medium grey, soft to firm, occasionally very soft, very sticky, pasty texture, slightly calcareous, locally very silty, grading to siltstone in parts.	
840	100	CLAYSTONE: medium grey, soft, occasionally very soft, amorphous to sub-blocky, slightly calcareous, locally very silty, trace mica, trace shell fragments.	

850	100	CLAYSTONE: medium grey, soft , occasionally very soft, amorphous to sub-blocky, slightly calcareous, locally very silty, trace mica, trace shell fragments, common microfossils.	
860	-	-	Missed sample.
870	90	CLAYSTONE: light to medium grey, soft to firm, occasionally very soft, very sticky, pasty texture, calcareous, locally very silty, grading to siltstone in parts.	
	10	SAND: loose quartz grains, generally transparent, translucent in parts, fine to medium grained, sub-round to sub-angular, sub-spherical, moderately sorted.	
880	-	-	No Returns
890	-	-	No Returns
900	100	CLAYSTONE: medium grey, soft to firm, sticky to crumbly, sub-blocky, micromicaceous, silty, non calcareous, very calcareous brownish grey cuttings in parts.	Appearance of very calcareous claystone.
910	100	CLAYSTONE: medium grey, soft to firm, sticky to crumbly, sub-blocky, micromicaceous, silty, non calcareous, very calcareous brownish grey cuttings in parts.	
920	100	CLAYSTONE: medium grey, soft to firm, sticky to crumbly, sub-blocky, micromicaceous, silty, non calcareous, very calcareous brownish grey cuttings in parts, good trace nodular pyrite, trace disseminated pyrite, micromicaceous, mottled with carbonaceous material.	
930	100	CLAYSTONE: medium to dark grey, brownish grey in parts, soft to firm, crumbly to sticky, sub-blocky, non calcareous grey cuttings, very calcareous brownish grey cuttings, silty, black carbonaceous laminations and speckling.	
940	100	CLAYSTONE: medium to dark grey, brownish grey in parts, soft to firm, crumbly to sticky, sub-blocky, non calcareous grey cuttings, very calcareous brownish grey cuttings, silty, black carbonaceous laminations and speckling.	
950	100	CLAYSTONE: medium to dark grey, brownish grey in parts, soft to firm, crumbly to sticky, sub-blocky, non calcareous grey cuttings, very calcareous brownish grey cuttings, silty, black carbonaceous laminations and speckling.	
	Tr	LIMESTONE: buff to very light brown, soft, mudstone to wackestone texture, sub-blocky, trace mica, speckled, argillaceous in parts.	
960	100	CLAYSTONE: medium to dark grey, brownish grey in parts, soft to firm, crumbly to sticky, sub-blocky, non calcareous grey cuttings, very calcareous brownish grey cuttings, silty, black carbonaceous laminations and speckling, trace coarse shell fragments.	2.41% gas peak at 963m.
	Tr	LIMESTONE: buff to light brown, mudstone to wackestone, soft, sub-blocky, micromicaceous, speckled, argillaceous.	
970	100	CLAYSTONE: Light to medium grey, dark grey, commonly speckled with dark grey to black carbonaceous material, dark grey to dark brownish brownish grey laminations, very calcareous brownish grey cuttings in parts, soft, occasionally firm, sub-blocky, silty.	
980	100	CLAYSTONE: Light to medium grey, dark grey, commonly speckled with dark grey to black carbonaceous material, dark grey to dark brownish brownish grey laminations, very calcareous brownish grey cuttings in parts, soft, occasionally firm, sub-blocky, silty, trace disseminated pyrite, pyritised microfossils.	
	Tr	LIMESTONE: cream, firm, mudstone, sub-blocky.	
	Tr	SAND: loose quartz grains, transparent, fine to medium grained, transparent, sub-round, moderate sphericity, moderate sorting.	
990	100	CLAYSTONE: Light to medium grey, dark grey, commonly speckled with dark grey to black carbonaceous material, dark grey to dark brownish brownish grey laminations, very calcareous brownish grey cuttings in parts, soft, occasionally firm, sub-blocky, silty, trace disseminated pyrite, pyritised microfossils.	
	Tr	SAND: rare, loose, transparent, sub-round to sub-angular grains.	
1000	100	CLAYSTONE: Light to medium grey, dark grey, commonly speckled with dark grey to black carbonaceous material, dark grey to dark brownish brownish grey laminations, very calcareous brownish grey cuttings in parts, soft, occasionally firm, sub-blocky, silty, common mica, trace nodular pyrite, trace shell fragments.	Circ. Hole clean at 1007m.
1010	100	CLAYSTONE: Light to medium grey, dark grey, calcareous light brown cuttings, commonly speckled with dark grey to black carbonaceous material, dark grey to dark brownish brownish grey laminations, very calcareous brownish grey cuttings in parts, soft, occasionally firm, sub-blocky, silty, common mica, trace nodular pyrite, trace shell fragments.	Driller says Fmn becoming firmer.
	Tr	SAND: loose, transparent, fine to coarse, sub-angular, poorly sorted.	
1020	100	CLAYSTONE: Light to medium grey, dark grey, calcareous light brown cuttings, commonly speckled with dark grey to black carbonaceous material, dark grey to dark brownish brownish grey laminations, very calcareous brownish grey cuttings in parts, soft, occasionally firm, sub-blocky, silty, coarse mica, trace shell fragments.	

1030	100	CLAYSTONE: medium grey, medium to dark grey, medium to dark brownish grey, soft to firm, sub-blocky, silty, non to slightly calcareous, occasional elongated platy cuttings, speckled in parts, trace coarse mica.	
	Tr	LIMESTONE: cream, firm, mudstone, sub-blocky.	
1040	100	CLAYSTONE: medium to dark grey, light grey in parts, light to medium brownish grey in parts, soft to firm, sub-blocky, silty, non to slightly calcareous, occasional elongated platy cuttings, speckled in parts, trace shell fragments.	
	Tr	LIMESTONE: cream, firm, mudstone, sub-blocky.	
1050	100	CLAYSTONE: medium to dark grey, light grey in parts, light to medium brownish grey in parts, soft to firm, sub-blocky, silty, non to slightly calcareous, occasional elongated platy cuttings, speckled in parts, trace shell fragments.	
	Tr	LIMESTONE: cream, firm, mudstone, sub-blocky.	
1060	100	CLAYSTONE: medium to dark grey, light grey in parts, light to medium brownish grey in parts, soft to firm, sub-blocky, silty, non to slightly calcareous, occasional elongated platy cuttings, speckled in parts, trace shell fragments.	
1070	100	CLAYSTONE: medium to dark grey, light grey in parts, light to medium brownish grey in parts, soft to firm, sub-blocky, silty, non to slightly calcareous, occasional elongated platy cuttings, speckled in parts, trace shell fragments.	
	Tr	LIMESTONE: very light grey, mudstone, soft to firm sub-blocky.	
1080	100	CLAYSTONE: medium to dark grey, light grey in parts, light to medium brownish grey in parts, soft to firm, sub-blocky, silty, non to slightly calcareous, occasional elongated platy cuttings, speckled in parts, trace shell fragments.	
	Tr	SAND: loose, transparent, fine, sub-angular to sub-round, moderate sphericity.	
1090	100	CLAYSTONE: medium to dark grey, light grey in parts, light to medium brownish grey in parts, soft to firm, sub-blocky, silty, non to slightly calcareous, occasional elongated platy cuttings, speckled in parts, dark grey/black laminations in parts, trace white to yellowish shell fragments.	
	Tr	SAND: loose, transparent, fine, sub-round to sub-angular, occasionally angular, moderate sphericity.	
1100	100	CLAYSTONE: medium to dark grey, light grey in parts, light to medium brownish grey in parts, soft to firm, sub-blocky, silty, non to slightly calcareous.	
1110	100	CLAYSTONE: medium to dark grey, light greenish grey in parts, light to medium brownish grey in parts, soft to firm, sub-blocky, silty, non to slightly calcareous.	
1120	100	CLAYSTONE: medium dark grey, light greenish grey in parts, light to medium brownish grey in parts, soft to firm, sub-blocky, silty, non to slightly calcareous.	
1130	100	CLAYSTONE: medium grey, light greenish grey in parts, light to medium brownish grey in parts, soft to firm, sub-blocky, silty, non to slightly calcareous, trace pyrite	
1140			Missed sample
1150	90	CLAYSTONE: medium grey, light greenish grey in parts, trace carbonaceous laminations, pyretic in places, soft to firm, sub-blocky, silty, non to slightly calcareous.	
	10	SAND: loose quartz, fine to medium grained, translucent, transparent.	
1160	100	CLAYSTONE: medium grey, light greenish grey in parts, rarely off white to very pale grey, soft to firm, sub-blocky, silty, non to slightly calcareous, trace pyrite.	
1170	100	CLAYSTONE: medium grey, light greenish grey in parts, rarely off white to very pale grey, soft to firm, sub-blocky, silty, non to slightly calcareous, trace pyrite.	
	Tr	SAND: loose quartz, fine to medium grained, translucent, transparent	
1180	100	CLAYSTONE: medium grey, light greenish grey, occasionally light brownish grey, soft to firm, sub-blocky to blocky, very silty, non calcareous.	
	Tr	SAND: loose quartz, fine to medium grained, translucent, transparent	
1190	60	CLAYSTONE: medium grey, light greenish grey, occasionally light brownish grey, very silty soft to firm, sub-blocky to blocky, non calcareous.	Top Utsira at 1187m
	40	SAND: loose quartz, colourless, translucent, very fine to medium grained, occasionally very fine, sub-round to round, moderately sorted, trace carbonaceous specks, trace pyrite. No shows.	
1200	50	CLAYSTONE: medium grey, light greenish grey, occasionally light brownish grey, very silty soft to firm, sub-blocky to blocky, non calcareous.	
	50	SAND: loose quartz, colourless, translucent, very fine to medium grained, occasionally very fine, sucrosic, sub-angular, sub-round, moderately sorted, trace carbonaceous specks, trace pyrite. No shows.	
1210	100	CLAYSTONE: medium grey, light greenish grey, occasionally light brownish grey, very silty soft to firm, sub-blocky to blocky, non calcareous.	

1220	70	CLAYSTONE: medium grey, light greenish grey, occasionally light brownish grey, very silty soft to firm, sub-blocky to blocky, non calcareous.	
	30	SAND: loose quartz, colourless, translucent, very fine to medium grained, occasionally very fine, sucrosic, sub-angular, sub-round, moderately sorted.	
1230	100	CLAYSTONE: medium brownish grey, very light grey, occasionally light brownish grey, firm sub-blocky to blocky, non calcareous.	
1240	70	CLAYSTONE: medium brownish grey, very light grey, occasionally light greenish grey, firm sub-blocky to blocky, non calcareous, very silty.	
	30	SAND: loose quartz, colourless, translucent, very fine to medium grained, occasionally very fine, sucrosic, sub-angular, sub-round, moderately sorted.	
1250	10	CLAYSTONE: medium brownish grey, firm sub-blocky to blocky, non calcareous, very silty.	
	90	SAND: loose quartz, colourless, translucent, very fine to medium grained, occasionally very fine, sucrosic, sub-angular, sub-round, moderately sorted, trace pyrite, trace glauconite	
1260	60	CLAYSTONE: medium brownish grey, very light grey, occasionally light greenish grey, firm sub-blocky to blocky, non calcareous, very silty.	
	40	SAND: loose quartz, colourless, translucent, very fine to medium grained, occasionally very fine, sucrosic, sub-angular, sub-round, moderately sorted.	
1270	90	SAND: loose quartz, colourless, translucent, very fine to medium grained, occasionally very fine, sucrosic, sub-angular, sub-round, moderately sorted, trace carbonaceous specks, trace pyrite. No shows.	Hordaland
	10	CLAYSTONE: medium brownish grey, very light grey, occasionally light greenish grey, firm sub-blocky to blocky, non calcareous, very silty.	
1280	80	SAND: loose quartz, colourless, translucent, very fine to medium grained, occasionally very fine, sucrosic, sub-angular, sub-round, moderately sorted.	
	20	CLAYSTONE: medium brownish grey, firm sub-blocky to blocky, non calcareous, very silty.	
1290	100	CLAYSTONE: medium brownish grey, light greyish green, soft to firm, blocky, non calcareous.	
1300	100	CLAYSTONE: medium brownish grey, light greyish green, rarely off white, soft to firm, blocky, non calcareous.	
1310	100	CLAYSTONE: medium brownish grey, light greyish green, trace pale brown, soft to firm, blocky, non calcareous.	
1319	100	CLAYSTONE: medium brownish grey, light greyish green, soft to firm, blocky, non calcareous.	Section TD
Hole: 12 ¼"			
1330	100	CLAYSTONE: medium to dark brownish grey, rare greyish green, soft to firm, blocky, amorphous, non calcareous.	Start of 12 ¼" Section
1340	100	CLAYSTONE: medium to dark brownish grey, rare greyish green, soft to firm, blocky, amorphous, non calcareous.	
1350	100	CLAYSTONE: medium to dark grey, light greyish green, soft to firm, blocky, non calcareous.	
1360	100	CLAYSTONE: medium to dark grey, homogenous, soft to firm, blocky, amorphous, non calcareous, slightly silty in places.	Trip at 1365m
1360	100	CLAYSTONE: medium to dark grey, homogenous, soft to firm, blocky, amorphous, non calcareous, slightly silty in places.	
1370	100	CLAYSTONE: medium to dark grey, homogenous, soft to firm, blocky, amorphous, non calcareous, slightly silty in places.	
1380	100	CLAYSTONE: medium to dark grey, homogenous, soft to firm, blocky, amorphous, non calcareous, slightly silty in places.	
1390	100	CLAYSTONE: medium to dark grey, homogenous, soft to firm, blocky, amorphous, non calcareous, slightly silty in places.	
1400	100	CLAYSTONE: dark brownish grey, homogenous, soft to firm, sub blocky, amorphous, sticky, non calcareous.	
1410	100	CLAYSTONE: dark brownish grey, homogenous, soft to firm, sub blocky, amorphous, sticky, non calcareous.	
1420	100	CLAYSTONE: dark brownish grey, homogenous, soft to firm, sub blocky, amorphous, sticky, non calcareous. Slightly silty	

1430	100	CLAYSTONE: dark brownish grey, homogenous, soft to firm, sub blocky, amorphous, sticky, non calcareous.	
1440	100	CLAYSTONE: dark brownish grey, homogenous, soft to firm, sub blocky, amorphous, sticky, non calcareous. Rarely slightly calcareous.	
1450	100	CLAYSTONE: dark brownish grey, homogenous, soft to firm, sub blocky, amorphous, sticky, non calcareous.	
1460	100	CLAYSTONE: dark brownish grey, homogenous, soft to firm, sub blocky, amorphous, sticky, non calcareous. Traces of mica and disseminated pyrite.	
1470			Missed
1480	100	CLAYSTONE: dark brownish grey, homogenous, soft to firm, sub blocky, amorphous, sticky, non calcareous.	
1490	100	CLAYSTONE: dark brownish grey, homogenous, soft to firm, sub blocky, amorphous, sticky, non calcareous.	
1500	100	CLAYSTONE: dark brownish grey, homogenous, soft to firm, sub blocky, amorphous, sticky, non calcareous.	
1510	100	CLAYSTONE: medium brownish grey, brownish black, olive black, occasionally greyish green, soft to firm, sub-blocky to blocky, sticky, slightly silty, micro-micaceous, trace disseminated pyrite, common traces of shell debris, non to very slightly calcareous.	
	Tr	LIMESTONE: very light grey, moderately hard, angular, slightly argillaceous.	
	Tr	DOLOMITE: moderate yellowish brown, hard, angular, cryptocrystalline.	
1520	100	CLAYSTONE: medium brownish grey, brownish black, olive black, occasionally greyish green, soft to firm, sub-blocky to blocky, sticky, slightly silty, micro-micaceous, trace disseminated pyrite, common traces of shell debris, non to very slightly calcareous.	
1520	100	CLAYSTONE: medium brownish grey, brownish black, olive black, occasionally greyish green, soft to firm, sub-blocky to blocky, sticky, slightly silty, micro-micaceous, trace disseminated pyrite, common traces of shell debris, non to very slightly calcareous.	
1530	100	CLAYSTONE: medium brownish grey, brownish black, olive black, occasionally greyish green, soft to firm, sub-blocky to blocky, sticky, slightly silty, micro-micaceous, trace disseminated pyrite, common traces of shell debris, non to very slightly calcareous.	
	Tr	LIMESTONE: very light grey, moderately hard, angular, slightly argillaceous, cryptocrystalline.	
	Tr	DOLOMITE: moderate yellowish brown, hard, angular, cryptocrystalline.	
1540	100	CLAYSTONE: medium brownish grey, brownish black, olive black, occasionally greyish green, soft to firm, sub-blocky to blocky, sticky, slightly silty, micro-micaceous, trace disseminated pyrite, common traces of shell debris, non to very slightly calcareous.	
	Tr	LIMESTONE: very light grey, moderately hard, angular, slightly argillaceous, cryptocrystalline.	
	Tr	DOLOMITE: moderate yellowish brown, hard, angular, cryptocrystalline.	
1550	100	CLAYSTONE: medium brownish grey, brownish black, olive black, occasionally greyish green, soft to firm, sub-blocky to blocky, sticky, slightly silty, micro-micaceous, trace disseminated pyrite, common traces of shell debris, non to very slightly calcareous.	
	Tr	LIMESTONE: very light grey, moderately hard, angular, slightly argillaceous, cryptocrystalline.	
	Tr	DOLOMITE: moderate yellowish brown, hard, angular, cryptocrystalline.	
1560	100	CLAYSTONE: dark grey to olive black, occasionally brownish black, soft to firm,amorphous to sub-blocky, sticky, silty, occasionally micro-micaceous, trace of disseminated pyrite, occasional shell fragments.	
1570	100	CLAYSTONE: dark grey to olive black, occasionally brownish black, soft to firm,amorphous to sub-blocky, sticky, silty, occasionally micro-micaceous, trace of disseminated pyrite, occasional shell fragments.	
1580			LOST
1590	100	CLAYSTONE: dark grey to olive black, occasionally brownish black, soft to firm,amorphous to sub-blocky, sticky, silty, occasionally micro-micaceous, trace of disseminated pyrite, occasional shell fragments.	
1600	100	CLAYSTONE: dark grey to olive black, occasionally brownish black, soft to firm,amorphous to sub-blocky, sticky, silty, occasionally micro-micaceous, trace of disseminated pyrite, occasional shell fragments.	
	Tr	LIMESTONE: light grey, moderately hard, angular, slightly argillaceous, cryptocrystalline.	
1610	100	CLAYSTONE: dark grey to olive black, occasionally brownish black, soft to firm,amorphous to sub-blocky, sticky, silty, occasionally micro-micaceous, trace of disseminated pyrite, occasional shell fragments.	
	Tr	LIMESTONE: light grey, moderately hard, angular, slightly argillaceous, cryptocrystalline.	

1620	100	CLAYSTONE: dark grey to olive black, occasionally brownish black, soft to firm,amorphous to sub-blocky, sticky, silty, occasionally micro-micaceous, trace of disseminated pyrite, occasional shell fragments. LIMESTONE: light grey, moderately hard, angular, slightly argillaceous, cryptocrystalline.
1630	100	CLAYSTONE: dark grey to olive black, occasionally brownish black, soft to firm, amorphous to sub-blocky, sticky, silty, occasionally micro-micaceous, trace of disseminated pyrite, occasional shell fragments. LIMESTONE: light grey, moderately hard, angular, slightly argillaceous, cryptocrystalline.
1640	100	CLAYSTONE: dark grey to olive black, occasionally brownish black, soft to firm, amorphous to sub-blocky, sticky, silty, occasionally micro-micaceous, trace of disseminated pyrite, occasional shell fragments. LIMESTONE: light grey, moderately hard, angular, slightly argillaceous, cryptocrystalline.
1650	100	CLAYSTONE: dark grey to olive black, occasionally brownish black, soft to firm,amorphous to sub-blocky, sticky, silty, occasionally micro-micaceous, trace of disseminated pyrite, occasional shell fragments. LIMESTONE: light grey, moderately hard, angular, slightly argillaceous, cryptocrystalline.
1660	100	CLAYSTONE: dark grey to olive black, occasionally brownish black, soft to firm,amorphous to sub-blocky, sticky, silty, occasionally micro-micaceous, trace of disseminated pyrite, occasional shell fragments. LIMESTONE: light grey, moderately hard, angular, slightly argillaceous, cryptocrystalline. DOLOMITE: moderate yellowish brown, hard, angular, cryptocrystalline.
1670	100	CLAYSTONE: dark grey to olive black, occasionally brownish black, soft to firm,amorphous to sub-blocky, sticky, silty, occasionally micro-micaceous, trace of disseminated pyrite, occasional shell fragments.
1680	100	CLAYSTONE: dark grey to olive black, occasionally brownish black, soft to firm,amorphous to sub-blocky, sticky, silty, occasionally micro-micaceous.
1690	100	CLAYSTONE: medium grey, trace greenish grey, soft to firm, amorphous to sub-blocky, sticky, non calcareous.
1700	100	CLAYSTONE: medium grey, trace greenish grey, soft to firm, amorphous to sub-blocky, sticky, non calcareous.
1710	100	CLAYSTONE: medium grey, rare dark streaks, trace greenish grey, soft to firm, amorphous to sub-blocky, sticky, non calcareous.
1720	100	CLAYSTONE: medium grey, trace greenish grey, soft to firm, amorphous to sub-blocky, sticky in places, non calcareous.
1730	100	CLAYSTONE: medium grey, trace greenish grey, soft to firm, amorphous to sub-blocky, sticky, non calcareous. LIMESTONE: off white, white, soft to firm, blocky, microcrystalline, occasionally grading to Dolomite.
1740	100	CLAYSTONE: medium grey, trace greenish grey, soft to firm, amorphous to sub-blocky, sticky, non calcareous.
1750	100	CLAYSTONE: medium grey, trace greenish grey, soft to firm, amorphous to sub-blocky, sticky, non calcareous.
1760	100	CLAYSTONE: medium grey, trace greenish grey, homogenous, soft to firm, amorphous to sub-blocky, slightly sticky, non calcareous.
1780	100	CLAYSTONE: medium grey, trace greenish grey, homogenous, soft to firm, amorphous to sub-blocky, slightly sticky, non calcareous.
1790	100	CLAYSTONE: medium grey, trace greenish grey, homogenous, soft to firm, amorphous to sub-blocky, slightly sticky, non calcareous.
1800	100	CLAYSTONE: medium grey, trace greenish grey, homogenous, soft to firm, amorphous to sub-blocky, slightly sticky, non calcareous.
1810	100	CLAYSTONE: medium grey, trace greenish grey, homogenous, soft to firm, amorphous to sub-blocky, slightly sticky, non calcareous.
1820	100	CLAYSTONE: medium to dark grey, homogenous, soft to firm, amorphous to sub-blocky, slightly sticky, non calcareous.
1830	100	CLAYSTONE: medium grey, trace greenish grey, homogenous, soft to firm, amorphous to sub-blocky, slightly sticky, non calcareous.
1840	100	CLAYSTONE: medium to dark grey, occasionally brownish grey, homogenous, soft to firm, amorphous to sub-blocky, non calcareous.
1850	100	CLAYSTONE: medium to dark grey, occasionally brownish grey, homogenous, soft to firm, amorphous to sub-blocky, non calcareous.

		amorphous to sub-blocky, non calcareous.	
1860	100	CLAYSTONE: medium to dark grey, occasionally brownish grey, homogenous, soft to firm, amorphous to sub-blocky, non calcareous.	
	Tr	LIMESTONE: off white, white, soft to firm, blocky, microcrystalline.	
1870	100	CLAYSTONE: medium to dark grey, occasionally brownish grey, homogenous, soft to firm, amorphous to sub-blocky, non calcareous.	
1880	100	CLAYSTONE: medium to dark grey, occasionally brownish grey, homogenous, soft to firm, amorphous to sub-blocky, non calcareous.	
1890		MISSED	
1900	100	CLAYSTONE: medium to dark grey, occasionally pale brownish grey, homogenous, soft to firm, amorphous to sub-blocky, non calcareous.	
1910	100	CLAYSTONE: medium to dark grey, occasionally brownish grey, homogenous, soft to firm, amorphous to sub-blocky, non calcareous.	
1920	100	CLAYSTONE: medium to dark grey, occasionally brownish grey, homogenous, soft to firm, amorphous to sub-blocky, non calcareous.	
1930	100	CLAYSTONE: medium to dark grey, occasionally brownish grey, homogenous, soft to firm, amorphous to sub-blocky, non calcareous. LIMESTONE: off white, buff, soft to firm, blocky, microcrystalline.	
1940	100	CLAYSTONE: medium to dark grey, occasionally brownish grey, homogenous, soft to firm, amorphous to sub-blocky, non calcareous.	
1950	100	CLAYSTONE: medium to dark grey, occasionally brownish grey, homogenous, soft to firm, amorphous to sub-blocky, non calcareous.	
	Tr	LIMESTONE: off white, buff, soft to firm, blocky, microcrystalline.	
1960	100	CLAYSTONE: medium to dark grey, occasionally brownish grey, homogenous, soft to firm, amorphous to sub-blocky, non calcareous.	
1970	100	CLAYSTONE: olive black to brownish black to olive grey, soft to firm, amorphous to sub-blocky, silty, traces of disseminated pyrite, slightly calcareous.	
1980	100	CLAYSTONE: olive black to brownish black to olive grey, soft to firm, amorphous to sub-blocky, silty, traces of disseminated pyrite, slightly calcareous	
	Tr	LIMESTONE : dark yellow grey, moderately hard, blocky, slightly argillaceous, cryptocrystalline.	
1990	100	CLAYSTONE: olive black to brownish black to olive grey, soft to firm, amorphous to sub-blocky, silty, traces of disseminated pyrite, slightly calcareous	
	Tr	LIMESTONE : dark yellow grey, moderately hard, blocky, slightly argillaceous, cryptocrystalline.	
2000	100	CLAYSTONE: olive black to brownish black to olive grey, soft to firm, amorphous to sub-blocky, silty, traces of disseminated pyrite, slightly calcareous	
	Tr	LIMESTONE : dark yellow grey, moderately hard, blocky, slightly argillaceous, cryptocrystalline.	
2010	90	CLAYSTONE: olive black to brownish black to olive grey, firm to moderately hard, sub-blocky, silty, non to very slightly calcareous.	
	10	LIMESTONE: dark yellow grey, moderately hard, angular, cryptocrystalline, grading in part to DOLOMITE.	
2020	90	CLAYSTONE: olive black to brownish black to olive grey, firm to moderately hard, sub-blocky, silty, non to very slightly calcareous.	
	10	LIMESTONE: dark yellow grey, moderately hard, angular, cryptocrystalline, grading in part to DOLOMITE.	
2040	100	CLAYSTONE: medium to dark grey, occasionally brownish grey, homogenous, soft to firm, amorphous to sub-blocky, non calcareous.	
	Tr	LIMESTONE: off white, buff, soft to firm, blocky, microcrystalline.	
	r	DOLOMITIC LIMESTONE: greyish brown, brownish grey, firm to locally moderately hard, crumbly, cryptocrystalline.	Minor amounts –1% cavings. Long and thin splintery type most common: 4-8cm long, 0.5-1.5cm wide, 0.2-0.7cm thick. Also some blocky and platy stress relief types. Cavings has been observed from start of this section. The brownish black cavings

2050	100	CLAYSTONE: medium to dark grey, occasionally brownish grey, homogenous, soft to firm, amorphous to sub-blocky, slightly silty, non calcareous.
	Tr	LIMESTONE: off white, buff, soft to firm, blocky, microcrystalline.
	r	DOLOMITIC LIMESTONE: greyish brown, brownish grey, sub-blocky to amorphous, firm to locally moderately hard, crumbly, cryptocrystalline.
	r	DOLOMITE: brownish grey, blocky, hard to very hard, angular break, microcrystalline.
2060	100	CLAYSTONE: greenish grey, medium grey, homogenous, soft to firm, amorphous to sub-blocky, slightly silty, non calcareous.
	Tr	LIMESTONE: very light grey, very pale orange, buff, soft to firm, blocky to amorphous, microcrystalline.
	r	DOLOMITIC LIMESTONE: greyish brown, brownish grey, sub-blocky to amorphous, firm to locally moderately hard, crumbly texture, cryptocrystalline.
	r	DOLOMITE: brownish grey, blocky, hard to very hard, angular break, microcrystalline.
2070	100	CLAYSTONE: greenish grey, medium grey, homogenous, soft to firm, amorphous to sub-blocky, slightly silty, non calcareous.
	Tr	LIMESTONE: very light grey, very pale orange, buff, soft to firm, blocky to amorphous, microcrystalline.
	r	DOLOMITIC LIMESTONE: greyish brown, brownish grey, sub-blocky to amorphous, firm to locally moderately hard, crumbly texture, cryptocrystalline.
	r	DOLOMITE: brownish grey, blocky, hard to very hard, angular break, microcrystalline.
2080	100	CLAYSTONE: varicoloured, greenish grey, greyish brown, occasionally medium grey, homogenous, soft to firm, sub-blocky, slightly silty, non calcareous.
	Tr	LIMESTONE: very light grey, very pale orange, buff, soft to firm, blocky to amorphous, microcrystalline.
	r	DOLOMITIC LIMESTONE: greyish brown, brownish grey, sub-blocky to amorphous, firm to locally moderately hard, crumbly texture, cryptocrystalline.
	r	DOLOMITE: brownish grey, blocky, hard to very hard, angular break, microcrystalline.
2090	100	CLAYSTONE: varicoloured, greenish grey, greyish brown, occasionally medium grey, rare brownish black, homogenous, soft to firm, sub-blocky, slightly silty, non calcareous.
	rr	LIMESTONE: very light grey, very pale orange, buff, soft to firm, blocky to amorphous, microcrystalline.
	r	DOLOMITIC LIMESTONE: greyish brown, brownish grey, sub-blocky to amorphous, firm to locally moderately hard, crumbly texture, cryptocrystalline.
	r	DOLOMITE: brownish grey, blocky, hard to very hard, angular break, microcrystalline.
2100	100	CLAYSTONE: varicoloured, greenish grey, greyish brown, occasionally medium grey, rare brownish black, homogenous, soft to firm, sub-blocky, slightly silty, non calcareous.
	r	LIMESTONE: very light grey, very pale orange, buff, firm, rarely hard, blocky to amorphous, microcrystalline. Rare milky white and translucent, crystalline.
	r	DOLOMITIC LIMESTONE: greyish brown, brownish grey, sub-blocky to amorphous, firm to locally moderately hard, crumbly texture, cryptocrystalline.
	r	DOLOMITE: brownish grey, blocky, hard to very hard, angular break, microcrystalline.
2110	100	CLAYSTONE: varicoloured, greenish grey, greyish brown, occasionally medium grey, rare brownish black, rare dark greenish grey, homogenous, soft to firm, sub-blocky, slightly silty, non calcareous.
	r	LIMESTONE: very light grey, very pale orange, buff, firm, rarely hard, blocky to amorphous, microcrystalline.
	r	DOLOMITIC LIMESTONE: greyish brown, brownish grey, sub-blocky to amorphous, firm to locally moderately hard, crumbly texture, cryptocrystalline.
	r	DOLOMITE: brownish grey, blocky, hard to very hard, angular break, microcrystalline.
2120	100	CLAYSTONE: varicoloured, greenish grey, greyish brown, occasionally medium grey, rare brownish black, rare dark greenish grey, homogenous, soft to firm, sub-blocky to blocky, slightly silty, non calcareous.
	r	LIMESTONE: very light grey, very pale orange, buff, firm, rarely hard, blocky to amorphous, microcrystalline.
	r	DOLOMITIC LIMESTONE: greyish brown, brownish grey, sub-blocky to amorphous, firm to locally moderately hard, crumbly texture, cryptocrystalline.
	r	DOLOMITE: brownish grey, blocky, hard to very hard, angular break, microcrystalline.
2130	100	CLAYSTONE: greenish grey, medium grey, homogenous, soft to firm, blocky, slightly silty, non calcareous.
	r	LIMESTONE: very light grey, very pale orange, buff, firm, rarely hard, blocky to amorphous, microcrystalline.
2140	100	CLAYSTONE: medium grey to medium dark grey, rare dark greenish grey, rare brownish grey, homogenous, soft to firm, blocky, slightly silty, non calcareous.
	Tr	LIMESTONE: very light grey, off white, buff, firm, blocky to amorphous, microcrystalline.
	r	DOLOMITIC LIMESTONE: greyish brown, brownish grey, sub-blocky to amorphous, firm to locally moderately hard, crumbly texture, cryptocrystalline.

The crystalline limestone observed in this sample only might indicate a fracture or the prognosed fault above top Balder.

2150	100	CLAYSTONE: medium grey to medium dark grey, rare dark greenish grey, rare brownish grey, homogenous, soft to firm, blocky, slightly silty, non calcareous.	
	Tr	LIMESTONE: very light grey, off white, buff, firm, blocky to amorphous, microcrystalline.	
	r	DOLOMITIC LIMESTONE: greyish brown, brownish grey, sub-blocky to amorphous, firm to locally moderately hard, crumbly texture, cryptocrystalline.	
2160	100	CLAYSTONE: medium grey to medium dark grey, occasionally greenish grey, rare brownish grey, homogenous, soft to firm, blocky, slightly silty, non calcareous.	
	Tr	LIMESTONE: very light grey, off white, buff, firm, blocky to amorphous, microcrystalline.	
	r	DOLOMITIC LIMESTONE: greyish brown, brownish grey, sub-blocky to amorphous, firm to locally moderately hard, crumbly texture, cryptocrystalline.	
2170	100	CLAYSTONE: medium grey to greenish grey, occasional brownish grey, rare dark greenish grey, homogenous, soft to firm, blocky, slightly silty, non calcareous.	
	Tr	LIMESTONE: off white to milky white, buff, firm, blocky to amorphous, microcrystalline.	
	r	DOLOMITIC LIMESTONE: greyish brown, brownish grey, sub-blocky to amorphous, firm to locally moderately hard, crumbly texture, cryptocrystalline.	
2180	100	CLAYSTONE: medium grey to greenish grey, medium dark grey, occasional brownish grey, rare dark greenish grey, homogenous, soft to firm, blocky, slightly silty, non calcareous.	
	r	LIMESTONE: off white to milky white, very light grey, buff, firm, blocky to amorphous, microcrystalline.	
	r	DOLOMITIC LIMESTONE: greyish brown, brownish grey, sub-blocky to amorphous, firm to locally moderately hard, crumbly texture, cryptocrystalline.	
2190			Lost
2200	100	CLAYSTONE: medium grey to greenish grey, medium dark grey, occasionally brownish grey, rare dark greenish grey, homogenous, soft to firm, blocky, slightly silty, non calcareous.	
	r	LIMESTONE: off white to milky white, very light grey, buff, firm, blocky to amorphous, microcrystalline.	
2210	100	CLAYSTONE: medium grey to greenish grey, medium dark grey, occasionally brownish grey, rare dark greenish grey, homogenous, soft to firm, blocky, slightly silty, non calcareous.	
	r	LIMESTONE: yellowish grey, very light grey, buff, firm, blocky to amorphous, microcrystalline.	
2220	100	CLAYSTONE: medium grey to greenish grey, medium dark grey, occasionally brownish grey, rare dark greenish grey, homogenous, soft to firm, blocky, slightly silty, non calcareous.	
	r	LIMESTONE: yellowish grey, very light grey, buff, firm, blocky to amorphous, microcrystalline.	
2230	100	CLAYSTONE: medium grey to greenish grey, medium dark grey, occasionally brownish grey, rare dark greenish grey, homogenous, soft to firm, blocky, slightly silty, rare micropyrritic laminations, non calcareous.	
	r	LIMESTONE: off white, yellowish grey, very light grey, buff, firm, blocky to amorphous, microcrystalline.	
	r	DOLOMITIC LIMESTONE: greyish brown, brownish grey, grading into translucent light grey, blocky to sub-blocky, firm to locally moderately hard, crumbly texture, cryptocrystalline.	
	r	DOLOMITE: brownish grey, blocky, hard to very hard, angular break, microcrystalline.	
2240	100	CLAYSTONE: medium grey to greenish grey, medium dark grey, occasionally brownish grey, rare dark greenish grey, homogenous, soft to firm, blocky, slightly silty, rare micropyrritic laminations, non calcareous.	
	r	LIMESTONE: off white, yellowish grey, very light grey, buff, firm, blocky to amorphous, microcrystalline.	
	r	DOLOMITIC LIMESTONE: greyish brown, brownish grey, grading into translucent light grey, blocky to sub-blocky, firm to locally moderately hard, crumbly texture, cryptocrystalline.	
	r	DOLOMITE: brownish grey, blocky, hard to very hard, angular break, microcrystalline.	
2250	60	CLAYSTONE: varicoloured, greyish brown, brownish black, greenish grey, homogenous, soft to firm, blocky, slightly silty, non calcareous.	Brown CLST Marker and Balder Tuff
	40	TUFFACEOUS CLAYSTONE: medium light grey to medium grey, soft to firm, locally slightly brittle, sub-blocky to amorphous, crumbly, black and white specks, rare glauconite, non calcareous.	
2260	40	CLAYSTONE: varicoloured, greyish brown, brownish black, greenish grey, homogenous, soft to firm, blocky, slightly silty, non calcareous.	Balder Tuff 16.1% gas peak at 2268m.
	40	TUFFACEOUS CLAYSTONE: medium light grey to medium grey, occasionally medium bluish grey, soft to firm, locally slightly brittle, sub-blocky to amorphous, crumbly, black and white specks, rare glauconite, non calcareous.	
	20	LIMESTONE: white, very light grey, yellowish grey, soft to firm, sub-blocky, locally with black specks (ash), microcrystalline. Rare translucent, hard, blocky, crystalline.	
	r	DOLOMITIC LIMESTONE: brownish grey, blocky, hard to very hard, angular break, microcrystalline.	

2270	100	CLAYSTONE: olive grey to medium dark grey, occasionally brownish black, occasionally brownish grey, firm, blocky, homogenous, slightly silty, non calcareous. LIMESTONE: off white, yellowish grey, very light grey, buff, soft to firm, blocky to amorphous, microcrystalline.	Sele
2280	100	CLAYSTONE: olive grey to medium dark grey, occasionally brownish black, occasionally brownish grey, firm, blocky, homogenous, slightly silty, non calcareous. LIMESTONE: off white, yellowish grey, very light grey, buff, soft to firm, blocky to amorphous, microcrystalline.	Cavings increase to 2-3 % else shape and size as before
2290	100	CLAYSTONE: olive grey to medium dark grey, occasionally brownish black, occasionally brownish grey, firm, blocky, homogenous, slightly silty, non calcareous. LIMESTONE: off white, yellowish grey, very light grey, buff, soft to firm, blocky to amorphous, microcrystalline. Rare translucent milky white, moderately hard, crystalline. DOLOMITIC LIMESTONE: brownish grey, dark yellowish brown, blocky to amorphous, soft to moderately hard, microcrystalline.	
2300	100	CLAYSTONE: olive grey to medium dark grey, occasionally brownish black, occasionally brownish grey, firm, blocky, homogenous, slightly silty, non calcareous.	
2310	100	CLAYSTONE: medium grey to olive grey, occasionally brownish black, occasionally brownish grey, rare very light grey, firm, blocky, homogenous, slightly silty, micromicaceous, non calcareous. LIMESTONE: off white, white, buff, soft to firm, blocky to amorphous, microcrystalline.	
2320	100	CLAYSTONE: medium grey to olive grey, occasionally brownish black, occasionally brownish grey, rare very light grey, firm, blocky, homogenous, slightly silty, micromicaceous, non calcareous. LIMESTONE: off white, white, with medium light grey argillaceous laminations, soft to firm, blocky to amorphous, microcrystalline.	
2330	100	CLAYSTONE: medium grey to olive grey, occasionally brownish grey, firm, blocky, homogenous, slightly silty, micromicaceous, non calcareous. LIMESTONE: off white, moderately hard, angular, blocky, common light grey argillaceous laminations	Lista
2340	100	CLAYSTONE: medium grey to olive grey, occasionally brownish grey, firm, blocky, homogenous, slightly silty, micromicaceous, non calcareous. LIMESTONE: off white, moderately hard, angular, blocky, common light grey argillaceous laminations	
2350	100	CLAYSTONE: medium grey to olive grey, also medium bluish grey, moderately hard, homogenous, sub-blocky, non calcareous. LIMESTONE: off white, moderately hard, angular, microcrystalline, argillaceous laminations.	Bit trip at 2355m
2360	100	CLAYSTONE: medium grey to olive grey, also medium bluish grey, firm to moderately hard and brittle when bluish grey, homogenous, sub-blocky to blocky, non calcareous. LIMESTONE: off white, moderately hard, angular, microcrystalline, argillaceous laminations. DOLOMITE: brownish grey, blocky, hard to very hard, angular break, microcrystalline.	
2370	100	CLAYSTONE: dominantly medium bluish grey, also medium grey to olive grey, rarely dark greenish grey, moderately hard and brittle else firm, homogenous, blocky, in parts sub-blocky, silty, slight micromicaceous, microcarbonaceous specs in parts, non calcareous. LIMESTONE: off white, moderately hard, angular, microcrystalline, argillaceous laminations. DOLOMITIC LIMESTONE: brownish grey, blocky, hard to very hard, angular break, microcrystalline.	
2380	100	CLAYSTONE: dominantly medium bluish grey, rarely dark greenish grey, rarely brownish grey, moderately hard and brittle else firm, homogenous, blocky, in parts sub-blocky, silty, slight micromicaceous, microcarbonaceous specs in parts, non calcareous. LIMESTONE: off white, soft to firm, amorphous to sub-blocky, microcrystalline. DOLOMITIC LIMESTONE: brownish grey, blocky, hard to very hard, angular break, microcrystalline. Pyrite: Nodule	
2390	100	CLAYSTONE: dominantly medium bluish grey, occasionally dark greenish grey to greenish grey, rarely brownish grey, moderately hard and brittle else firm, homogenous, blocky, in parts sub-blocky, silty, slight micromicaceous, microcarbonaceous specs in parts, non calcareous. LIMESTONE: off white, yellowish grey, soft, moderately hard, blocky to amorphous, angular, microcrystalline.	
2395	100	CLAYSTONE: dominantly medium bluish grey, occasionally dark greenish grey to greenish grey, rarely brownish grey, firm, homogenous, blocky, in parts sub-blocky, slightly silty, slight micromicaceous, microcarbonaceous specs in parts, non calcareous. LIMESTONE: off white, yellowish grey, soft moderately hard, blocky to amorphous, angular, microcrystalline. SILTSTONE: dark yellowish brown to pale yellowish brown, firm to moderately hard,	Spot sample at 12% gas reading

		blocky, rarely sandy, non calcareous.	No show.
2400	100	CLAYSTONE: dominantly medium bluish grey, rarely dark greenish grey to greenish grey, rarely dusky yellowish brown, firm, homogenous, blocky, in parts sub-blocky, silty, slight micromicaceous, microcarbonaceous specs in parts, non calcareous.	
	r	LIMESTONE: off white, yellowish grey, very pale orange, soft, moderately hard, blocky to amorphous, angular, microcrystalline.	
2410	100	CLAYSTONE: dominantly medium bluish grey, rarely dark greenish grey to greenish grey, rarely dusky yellowish brown, firm, homogenous, blocky, in parts sub-blocky, silty, slight micromicaceous, microcarbonaceous specs in parts, non calcareous.	8% gas spike
	Tr	LIMESTONE: off white, yellowish grey, soft, blocky to amorphous, angular, microcrystalline.	
	r	SILTSTONE: dark yellowish brown to pale yellowish brown, firm to moderately hard, blocky, rarely sandy, non calcareous.	
2420	100	CLAYSTONE: dominantly greyish brown, minor brownish black, rarely greyish red, also medium bluish grey, medium dark grey, firm, homogenous, blocky to sub-blocky, slightly silty, non calcareous.	Maureen
	Tr	LIMESTONE: off white, yellowish grey, soft, blocky to amorphous, microcrystalline.	
2425	100	CLAYSTONE: dominantly greyish brown, rarely greyish red, firm, homogenous, sub-blocky, slightly silty, non calcareous.	Spot
	r	CLAYSTONE 2: dominantly medium bluish grey, rarely dark greenish grey to greenish grey, rarely dusky yellowish brown, firm, homogenous, blocky, in parts sub-blocky, silty, slight micromicaceous, microcarbonaceous specs in parts, non calcareous.	CLST 2 ? caved
		LIMESTONE: off white, yellowish grey, soft, blocky to amorphous, angular, microcrystalline.	
2430	100	CLAYSTONE : dominantly medium bluish grey, rarely dark greenish grey to greenish grey, rarely dusky yellowish brown, firm, homogenous, blocky, in parts sub-blocky, silty, slight micromicaceous, microcarbonaceous specs in parts, non calcareous.	
2440	100	MARL: light grey to medium light grey, soft to firm, amorphous to sub-blocky, trace of micromica, grading to calcareous claystone.	Våle 2434
2450	100	MARL: light grey to medium light grey, soft to firm, amorphous to sub-blocky, trace of micromica, grading to calcareous claystone.	Ekofisk 2445
	Tr	LIMESTONE: very light grey, soft to firm, blocky, cryptocrystalline.	
2460	100	LIMESTONE: off white to yellowish grey, soft to firm, occasionally moderately hard, sub-blocky to blocky, cryptocrystalline, trace of chert, light grey, hard, angular, brittle.	TOR 2454
2470	100	LIMESTONE: yellowish grey to pinkish grey, soft to firm, locally moderately hard, sub-blocky to blocky, occasional argillaceous laminations, cryptocrystalline.	6 % Gas peak
2480	100	LIMESTONE: off-white to very light grey to yellowish grey to pinkish grey, firm, locally moderately hard, blocky, brittle, clean, chalky, mudstone texture, micro to cryptocrystalline.	5% Hordalnd cavings present in samples (in the small sieve fraction). About 1% larger cavings on the shakers.
2490	100	LIMESTONE: off-white to very light grey to yellowish grey to pinkish grey, firm, locally moderately hard, blocky, brittle, clean, chalky, mudstone texture, micro to cryptocrystalline.	
2500	100	LIMESTONE: off-white to very light grey to yellowish grey to pinkish grey, firm, locally moderately hard, blocky, brittle, clean, chalky, mudstone texture, micro to cryptocrystalline.	
2510	100	LIMESTONE: off-white to very light grey to yellowish grey to pinkish grey, firm, locally moderately hard, blocky, brittle, clean, chalky, mudstone texture, micro to cryptocrystalline.	
2520	100	LIMESTONE: off-white to very light grey to yellowish grey to pinkish grey, firm, locally moderately hard, blocky, brittle, clean, chalky, mudstone texture, micro to cryptocrystalline.	
2530	100	LIMESTONE: off-white to very light grey to yellowish grey to pinkish grey, firm, locally moderately hard, blocky, brittle, clean, chalky, mudstone texture, micro to cryptocrystalline.	
	r	MARL: light grey, firm, blocky, locally lam with limestone.	
2540	100	LIMESTONE: off-white to very light grey to yellowish grey to pinkish grey, firm, locally moderately hard, blocky, brittle, clean, chalky, mudstone texture, micro to cryptocrystalline.	
2550	100	LIMESTONE: off-white to very light grey to yellowish grey to pinkish grey, firm, locally moderately hard, blocky, brittle, clean, chalky, mudstone texture, micro to cryptocrystalline.	
2560	100	LIMESTONE: off-white to very light grey to yellowish grey to pinkish grey, firm, locally moderately hard, blocky, brittle, clean, chalky, mudstone texture, micro to cryptocrystalline.	
	r	MARL: light grey, firm, blocky, locally lam with limestone.	
2570	100	LIMESTONE: off-white to very light grey to yellowish grey to pinkish grey, firm, locally moderately hard, blocky, brittle, clean, chalky, mudstone texture, micro to cryptocrystalline.	
	r	MARL: light grey, firm, blocky, locally lam with limestone.	
2580	100	LIMESTONE: off-white to very light grey to yellowish grey to pinkish grey, firm, locally moderately hard, blocky, brittle, clean, chalky, mudstone texture, micro to cryptocrystalline.	Still 5 % cavings in the small sieve fraction

		moderately hard, blocky, brittle, clean, chalky, mudstone texture, micro to cryptocrystalline. MARL: light grey, firm, blocky, locally lam with limestone.	small sieve fraction.
2590	100	LIMESTONE: off-white to very light, firm, locally moderately hard, blocky, brittle, clean, chalky, mudstone texture, micro to cryptocrystalline. MARL: light grey, firm, blocky, locally lam with limestone.	Hod
2600	100	LIMESTONE: off-white to very light, firm, locally moderately hard, blocky, brittle, clean, chalky, mudstone texture, micro to cryptocrystalline.	
2610	100	LIMESTONE: off-white to very light, firm, locally moderately hard, blocky, brittle, clean, chalky, mudstone texture, micro to cryptocrystalline.	
2620	100	LIMESTONE: off-white to very light, firm, locally moderately hard, blocky, brittle, clean, chalky, mudstone texture, micro to cryptocrystalline. MARL: light grey, soft to firm, sub-blocky, very slightly microcarbonaceous speckled.	
2630	90	LIMESTONE: off-white to very light, firm, locally moderately hard, blocky, brittle, clean, chalky, mudstone texture, micro to cryptocrystalline.	
	10	MARL: light grey, minor medium grey, soft to firm, sub-blocky to amorphous, very slightly microcarbonaceous speckled, rarely bonded with limestone.	
2640	95	LIMESTONE: off-white to very light, firm, locally moderately hard, blocky, brittle, clean, chalky, mudstone texture, micro to cryptocrystalline.	
	5	MARL: light grey, minor medium grey, soft to firm, sub-blocky to amorphous, very slightly microcarbonaceous speckled, rarely bonded with limestone.	
2650	90	LIMESTONE: off white to light grey, firm, locally moderately hard, blocky, brittle, micro to cryptocrystalline, N/S	
	10	MARL: light grey, soft to firm, sub-blocky to amorphous, trace of black specks.	
2660	90	LIMESTONE: generally as before, also pale red, firm to moderately hard, blocky, argillaceous, microcrystalline	
	10	MARL: light grey to medium grey, soft to firm.	
2670	100	LIMESTONE: pale reddish brown, hard, blocky, slightly argillaceous, microcrystalline, locally grading to marl	Blodøks
2680	100	LIMESTONE: predominantly red brown to pale red, blocky, firm , microcrystalline, grading to marl in part, also medium grey, firm, blocky, common argillaceous laminations	HIDRA
2690	30	LIMESTONE: red brown to pale red, blocky, firm , microcrystalline, grading to marl in part.	RØDBY
	50	MARL: light to medium grey, soft, pasty, very finely sandy, glauconitic.	
	20	SANDSTONE/SANDY LIMESTONE: light grey to off white, translucent quartz grains, very fine to fine, sub-rounded, often loose, also with abundant white calcareous matrix, soft to friable, common argillaceous streaks, glauconite, poor visible porosity, no shows.	
2700	20	LIMESTONE: off white to light to pale red brown, moderately hard, angular, blocky, argillaceous and grading to marl	
	60	MARL: pale brown to brown, , firm, blocky, grading to Marl	
	20	SANDSTONE/SANDY LIMESTONE: light grey to off white, translucent quartz grains, very fine to fine, sub-rounded, often loose, also with abundant white calcareous matrix, soft to friable, common argillaceous streaks, glauconite, poor visible porosity, no shows	
2710	60	MARL: dark to moderate brown, occasionally olive black to olive grey, amorphous to sub-blocky, soft to firm, grading to argillaceous limestone.	
	20	LIMESTONE: light grey, firm to moderately hard, sub-blocky, argillaceous, microcrystalline.	
	20	SANDSTONE: light grey to off white, translucent quartz grains, very fine to fine, sub-rounded, often loose, also with abundant white calcareous matrix, soft to friable, common argillaceous streaks, glauconite, poor visible porosity, no shows	
2720	80	MARL: dark to moderate brown, soft to firm, amorphous to sub-blocky.	
	10	LIMESTONE: light grey, firm to moderately hard, sub-blocky, argillaceous, microcrystalline.	
	10	SANDSTONE : light grey to off white, translucent quartz grains, very fine to fine, sub-rounded, often loose, also with abundant white calcareous matrix, soft to friable, common argillaceous streaks, glauconite, poor visible porosity, no shows	
2730	30	LIMESTONE: light grey to off white, firm to moderately hard, sub-blocky, microcrystalline.	
	30	CLAYSTONE: olive black to olive grey, firm, sub-blocky, strongly calcareous and locally grading to marl.	
	60	MARL: moderate brown, occasionally medium grey, soft to firm, grading in part to limestone.	
2740	60	LIMESTONE: light grey to light olive grey, soft to firm, amorphous to sub-blocky, common argillaceous laminations, microcrystalline, locally very finely sandy.	Sola
	40	CLAYSTONE: olive black to olive grey, occasionally red brown, soft to firm, amorphous to sub-blocky, traces of carbonaceous material, strongly calcareous and grading to marl.	
2750	70	LIMESTONE: light grey to light olive grey, soft to firm, amorphous to sub-blocky, common argillaceous laminations, microcrystalline, locally very finely sandy.	
	30	CLAYSTONE: olive black to olive grey, occasionally red brown, soft to firm, amorphous to	

		sub-blocky, traces of carbonaceous material, strongly calcareous and grading to marl.	
2753	60	LIMESTONE: light grey to light olive grey, soft to firm, amorphous to sub-blocky, common argillaceous laminations, microcrystalline, locally very finely sandy.	
	30	CLAYSTONE: olive black to olive grey, occasionally red brown, soft to firm, amorphous to sub-blocky, traces of carbonaceous material, strongly calcareous and grading to marl.	
	10	MARL: red brown, firm, sub-blocky, grading to claystone.	
2756	70	LIMESTONE: light grey to light olive grey, soft to firm, amorphous to sub-blocky, common argillaceous laminations, microcrystalline, locally very finely sandy.	
	30	CLAYSTONE: olive black to olive grey, occasionally red brown, soft to firm, amorphous to sub-blocky, traces of carbonaceous material, strongly calcareous and grading to marl.	
2759	80	LIMESTONE: light grey to light olive grey, soft to firm, amorphous to sub-blocky, common argillaceous laminations, microcrystalline, locally very finely sandy.	
	20	CLAYSTONE: dark grey to olive black, firm to moderately hard, sub-blocky, silty, slightly carbonaceous.	
2762	80	LIMESTONE: light grey to light olive grey, soft to firm, amorphous to sub-blocky, common argillaceous laminations, microcrystalline, locally very finely sandy.	
	20	CLAYSTONE: dark grey to olive black, firm to moderately hard, sub-blocky, silty, slightly carbonaceous.	
2766		Lost in hole	Pull out to shoe without circulating BU because Kelly hose burst.
2768	70	MARL: greyish red-moderate brown, minor pale red brown to light brown, firm to moderately hard, in parts micromicaceous, very argillaceous locally grade to a calcareous claystone, also locally very calcareous grading to a limestone.	BU after trip had large 8-5-0.3cm platy cavings.
	30	CLAYSTONE: olive black to brown black, moderately hard, blocky, slightly micromicaceous, slightly silty, non calcareous.	Sample caught late?
	Tr	LIMESTONE: yellowish grey to medium light grey, firm, blocky, microcrystalline, slight argillaceous.	
2771	70	MARL: greyish red-moderate brown, minor pale red brown to light brown, firm to moderately hard, in parts micromicaceous, very argillaceous locally grade to a calcareous claystone, also locally very calcareous grading to a limestone.	Åsgard/Valhall 2771m
	30	CLAYSTONE: olive black to brown black, moderately hard, blocky, slightly micromicaceous, slightly silty, non calcareous.	
	Tr	LIMESTONE: yellowish grey to medium light grey, firm, blocky, microcrystalline, slight argillaceous.	
2774	70	MARL: greyish red-moderate brown, minor pale red brown to light brown, firm to moderately hard, in parts micromicaceous, very argillaceous locally grade to a calcareous claystone, also locally very calcareous grading to a limestone.	
	20	CLAYSTONE: olive black to brown black, moderately hard, blocky, slightly micromicaceous, slightly silty, non calcareous.	
	10	LIMESTONE: yellowish grey to medium light grey, firm, blocky, microcrystalline, slight argillaceous.	
2777	90	MARL: greyish red-moderate brown, minor pale red brown to light brown, firm to moderately hard, in parts micromicaceous, very argillaceous locally grade to a calcareous claystone, also locally very calcareous grading to a limestone.	1% caving at shakers
	10	CLAYSTONE: olive black to brown black, dark grey, firm to occasionally moderately hard, sub-fissile, occasionally blocky, slightly micromicaceous, slightly silty, non calcareous.	
	Tr	LIMESTONE: yellowish grey to medium light grey, firm, blocky, microcrystalline, slight argillaceous.	
2780	90	MARL: greyish red-moderate brown, minor pale red brown to light brown, firm to moderately hard, in parts micromicaceous, very argillaceous locally grade to a calcareous claystone, also locally very calcareous grading to a limestone.	
	10	CLAYSTONE: olive black to brown black, dark grey, firm to occasionally moderately hard, sub-fissile, occasionally blocky, slightly micromicaceous, slightly silty, non calcareous.	
	Tr	LIMESTONE: yellowish grey to medium light grey, firm, blocky, microcrystalline, slight argillaceous.	
2783	90	MARL grading Claystone: dominantly very light grey, minor pale red brown to light brown, soft to firm, amorphous to sub-blocky, in parts micromicaceous, very argillaceous locally grade to a calcareous claystone.	
	10	CLAYSTONE: olive black to brown black, dark grey, firm to occasionally moderately hard, sub-fissile, occasionally blocky, slightly micromicaceous, slightly silty, non calcareous.	
	Tr	LIMESTONE: yellowish grey to medium light grey, firm, blocky, microcrystalline, slight argillaceous.	
2786	90	MARL grading Claystone: varicoloured very light grey and minor pale red brown to light brown, soft to firm, amorphous to sub-blocky, in parts micromicaceous, very argillaceous locally grade to a calcareous claystone.	
	10	CLAYSTONE: olive black to brown black, dark grey, firm to occasionally moderately hard, sub-fissile, occasionally blocky, slightly micromicaceous, slightly silty, non calcareous.	
	Tr	LIMESTONE: yellowish grey to medium light grey, firm, blocky, microcrystalline, slight	

		argillaceous.	
2789	80	MARL: greyish red-moderate brown, minor pale red brown to light brown, firm to moderately hard, in parts micromicaceous, very argillaceous locally grade to a calcareous claystone, also locally very calcareous grading to a limestone.	
	20	MARL grading Claystone: varicoloured very light grey and minor pale red brown to light brown, soft to firm, amorphous to sub-blocky, in parts micromicaceous, very argillaceous locally grade to a calcareous claystone.	
	Tr	CLAYSTONE: olive black to brown black, dark grey, firm to occasionally moderately hard, sub-fissile, occasionally blocky, slightly micromicaceous, slightly silty, non calcareous.	
	Tr	LIMESTONE: yellowish grey to medium light grey, firm, blocky, microcrystalline, slight argillaceous.	
2792	80	MARL: greyish red-moderate brown, minor pale red brown to light brown, firm to moderately hard, in parts micromicaceous, very argillaceous locally grade to a calcareous claystone, also locally very calcareous grading to a limestone.	
	Tr	CLAYSTONE: olive black to brown black, dark grey, firm to occasionally moderately hard, sub-fissile, occasionally blocky, slightly micromicaceous, slightly silty, non calcareous.	
	Tr	LIMESTONE: yellowish grey to medium light grey, firm, blocky, microcrystalline, slight argillaceous.	
2795	10	MARL grading Claystone very light grey, minor pale red brown, soft to firm, amorphous to sub-blocky, in parts micromicaceous, very argillaceous locally grade to a calcareous claystone.	
	5	CLAYSTONE: olive black to brown black, dark grey, firm to occasionally moderately hard, sub-fissile, occasionally blocky, slightly micromicaceous, slightly silty, non calcareous.	
	85	LIMESTONE: white to very light grey, firm to moderately hard, blocky, clean, microcrystalline.	
2798	30	MARL grading Claystone: very light grey, soft to firm, amorphous to sub-blocky, in parts micromicaceous, very argillaceous locally grade to a calcareous claystone.	
	Tr	CLAYSTONE: olive black to brown black, dark grey, firm to occasionally moderately hard, sub-fissile, occasionally blocky, slightly micromicaceous, slightly silty, non calcareous.	
	60	LIMESTONE: white to very light grey, firm to moderately hard, blocky, clean, microcrystalline.	
2801	100	CLAYSTONE: olive black to olive grey, soft to firm, blocky to sub-fissile, earthy, crumbly surface texture, slightly micromicaceous, trace carbonaceous material, slightly silty, minor disseminated micropyrte, non to slightly calcareous. Trace of pyrite nodules.	Draupne 2798m Dull blue white crush cut fluorescence.
	r	LIMESTONE: off-white to very light grey, firm to moderately hard, blocky, trace argillaceous material, microcrystalline.	
2804	100	CLAYSTONE: olive black to olive grey, soft to firm, blocky to sub-fissile, earthy, crumbly surface texture, slightly micromicaceous, trace carbonaceous material, slightly silty, minor disseminated micropyrte, non to slightly calcareous. Trace of pyrite nodules.	No visible cut. Dull blue white crush cut fluorescence.
	r	LIMESTONE: off-white to very light grey, firm to moderately hard, blocky, trace argillaceous material, microcrystalline.	
2807	100	CLAYSTONE: olive black to olive grey, soft to firm, blocky to sub-fissile, earthy, crumbly surface texture, slightly micromicaceous, trace carbonaceous material, slightly silty, minor disseminated micropyrte, non to slightly calcareous. Trace of pyrite nodules.	
	r	LIMESTONE: off-white to very light grey, firm to moderately hard, blocky, trace argillaceous material, microcrystalline.	
2810	100	CLAYSTONE: olive black to olive grey, soft to firm, blocky to sub-fissile, earthy, crumbly surface texture, slightly micromicaceous, trace carbonaceous material, slightly silty, minor disseminated micropyrte, non to slightly calcareous. Trace of pyrite nodules.	
	r	LIMESTONE: off-white to very light grey, firm to moderately hard, blocky, trace argillaceous material, microcrystalline.	
2813	100	CLAYSTONE: olive black to olive grey, soft to firm, blocky to sub-fissile, earthy, crumbly surface texture, slightly micromicaceous, trace carbonaceous material, slightly silty, minor disseminated micropyrte, non to slightly calcareous. Trace of pyrite nodules.	
	r	LIMESTONE: off-white to very light grey, firm to moderately hard, blocky, trace argillaceous material, microcrystalline.	
2816	100	CLAYSTONE: olive black to olive grey, soft to firm, blocky to sub-fissile, earthy, crumbly surface texture, slightly micromicaceous, trace carbonaceous material, slightly silty, minor disseminated micropyrte, non to slightly calcareous. Trace of pyrite nodules.	
	r	LIMESTONE: off-white to very light grey, firm to moderately hard, blocky, trace argillaceous material, microcrystalline.	
2819	100	CLAYSTONE: olive black to olive grey, soft to firm, blocky to sub-fissile, earthy, crumbly surface texture, slightly micromicaceous, trace carbonaceous material, slightly silty, minor disseminated micropyrte, non to slightly calcareous. Trace of pyrite nodules. Trace of plant remains.	
	r	LIMESTONE: off-white to very light grey, firm to moderately hard, blocky, trace argillaceous material, microcrystalline.	
2822	100	CLAYSTONE: olive black to olive grey, soft to firm, blocky to sub-fissile, earthy, crumbly surface texture, slightly micromicaceous, trace carbonaceous material, slightly silty, minor	

	r	disseminated micropyrrite, non to slightly calcareous. Trace of pyrite nodules. LIMESTONE: off-white to very light grey, firm to moderately hard, blocky, trace argillaceous material, microcrystalline.	
2825	100	CLAYSTONE: olive black to olive grey, soft to firm, blocky to sub-fissile, earthy, crumbly surface texture, slightly micromicaceous, trace carbonaceous material, silty, minor disseminated micropyrrite, non to slightly calcareous.	
	r	LIMESTONE: off-white to very light grey, firm to moderately hard, blocky, trace argillaceous material, microcrystalline.	
2828	100	CLAYSTONE: olive black to olive grey, soft to firm, blocky to sub-fissile, earthy, crumbly surface texture, slightly micromicaceous, trace carbonaceous material, silty, minor disseminated micropyrrite, non to slightly calcareous.	
	r	LIMESTONE: off-white to very light grey, firm to moderately hard, blocky, trace argillaceous material, microcrystalline.	
2831	100	CLAYSTONE: olive black to olive grey, soft to firm, blocky to sub-fissile, earthy, crumbly surface texture, slightly micromicaceous, trace carbonaceous material, silty, minor disseminated micropyrrite, non to slightly calcareous. Trace of pyrite nodules.	Heather
	Tr	LIMESTONE: off-white to very light grey, firm to moderately hard, blocky, trace argillaceous material, microcrystalline.	
	Tr	SANDSTONE: very light grey, clear to translucent quartz grains, very fine, very well sorted, sub-angular, abundant calcareous cemented/matrix, trace glauconite, grading arenaceous limestone.	
2835	60	CLAYSTONE: olive black to olive grey, soft to firm, blocky to sub-fissile, earthy, crumbly surface texture, slightly micromicaceous, trace carbonaceous material, silty, minor disseminated micropyrrite, non to slightly calcareous.	SST. No direct fluorescence, dull blue-purple white
	40	SANDSTONE: light brownish grey to medium grey, clear to translucent quartz grains, very fine to fine, well sorted, sub-angular, abundant calcareous cement/matrix, locally slight argillaceous matrix, trace glauconite, no visible porosity.	slow cloudy cut fluorescence.
Hole: 8 ½"			12 ¼" section TD
2843	100	SANDSTONE: predominantly loose quartz grains, colourless/transparent to pale grey/translucent, fine to medium grained, occasionally coarse grained, generally sub-angular, sub-spherical, moderately sorted, trace glauconite, trace pyrite.	8 ½" section Oxfordian SST, RZ1
2846	-	Missed	Missed. High ROP.
2849	-	Missed	Missed. High ROP.
2852	100	SANDSTONE: light to medium grey, medium to dark grey, occasionally brownish grey cuttings, firm to hard cuttings, blocky to sub-blocky cuttings, dark argillaceous matrix, slightly calcareous cement, transparent to translucent grains, occasionally milky white, fine to medium grained, occasionally coarse grained, sub-round to sub-angular, moderately to well sorted, trace glauconite, trace pyrite, micro-micaceous.	
2858	100	SANDSTONE: light to medium grey, medium to dark grey, occasionally brownish grey cuttings, firm to hard cuttings, blocky to sub-blocky cuttings, dark argillaceous matrix, slightly calcareous cement, transparent to translucent grains, occasionally milky white, fine to medium grained, occasionally coarse grained, sub-round to sub-angular, moderately to well sorted, trace glauconite, trace pyrite, micro-micaceous.	
2861	100	SANDSTONE: light to medium grey, medium to dark grey, occasionally brownish grey cuttings, firm to hard cuttings, blocky to sub-blocky cuttings, dark argillaceous matrix, slightly calcareous cement, transparent to translucent grains, occasionally milky white, fine to medium grained, occasionally coarse grained, sub-round to sub-angular, moderately to well sorted, trace glauconite, trace pyrite, micro-micaceous.	
2864	100	SANDSTONE: light to medium grey, medium to dark grey, occasionally brownish grey cuttings, firm to hard cuttings, blocky to sub-blocky cuttings, dark argillaceous matrix, slightly calcareous cement, transparent to translucent grains, occasionally milky white, fine to medium grained, occasionally coarse grained, sub-round to sub-angular, moderately to well sorted, trace glauconite, trace pyrite, micro-micaceous.	
2867	100	SANDSTONE: predominantly loose quartz grains, transparent to translucent, occasionally milky white, fine to medium grained, occasionally coarse grained, sub-angular to sub-round, moderately to well sorted, cuttings commonly mottled off white/light to dark grey/ brown, micromicaceous, trace pyrite, slightly calcareous cement.	
2870	100	SANDSTONE: predominantly loose quartz grains, colourless/transparent to pale grey/translucent, fine to medium grained, occasionally coarse grained, sub-angular to sub-round, high sphericity to sub-spherical, moderately to well sorted.	
2873	100	SANDSTONE: predominantly loose quartz grains, colourless/transparent to pale grey/translucent, fine to medium grained, increase in coarse grained grains, sub-angular to sub-round, high sphericity to sub-spherical, moderately to well sorted.	
2876	100	SANDSTONE: predominantly loose quartz grains, colourless/transparent to pale grey/translucent, fine to medium grained, occasionally coarse grained, sub-angular to sub-round, high sphericity to sub-spherical, moderately to well sorted, trace pyrite.	No direct fluorescence, no crush cut fluorescence, dull yellow residue, moderate bright

			residual ring.
2879	-	Missed.	Missed. High ROP.
2882	100	SANDSTONE: predominantly loose quartz grains, colourless/transparent to pale grey/translucent, fine to medium grained, occasionally coarse grained, sub-angular to sub-round, high sphericity to sub-spherical, moderately to well sorted, trace pyrite. Sample has light to dark grey appearance due to increased argillaceous content. Dark grey argillaceous laminations in some cuttings.	
2885	-	Missed.	Missed. High ROP.
2888	100	SANDSTONE: predominantly medium to dark grey cuttings with argillaceous matrix, also loose quartz grains, colourless/transparent to pale grey/translucent, fine to medium grained, occasionally coarse grained, sub-angular to sub-round, high sphericity to sub-spherical, moderately to well sorted, trace pyrite.	
2891	-	Missed	Missed. High ROP.
2894	100	SANDSTONE: cleaner sample. Decreased argillaceous material. Loose quartz grains, colourless/transparent to pale grey/translucent, fine to medium grained, occasionally coarse grained, sub-angular to sub-round, high sphericity to sub-spherical, moderately to well sorted, trace pyrite, occasional grey to brownish grey argillaceous matrix.	
2897	-	Missed	Missed. High ROP.
2900	100	SANDSTONE: Loose quartz grains, colourless/transparent to pale grey/translucent, fine to medium grained, occasionally coarse grained, sub-angular to sub-round, high sphericity to sub-spherical, moderately to well sorted, trace pyrite. Occasional pale grey to pale greenish grey cuttings.	
2903	-	Missed	Missed. High ROP.
2906	-	Missed	Missed. High ROP.
2909	100	SANDSTONE: predominantly loose quartz grains with very pale grey to very pale brownish cuttings in parts, transparent to translucent grains, fine to medium grained, occasional coarse grains, sub-round to sub-angular, occasionally angular, generally good sphericity, moderately to well sorted.	
2912	-	Missed	Missed. High ROP.
2915	100	SANDSTONE: predominantly off white to very pale grey sample, paste, like rock flour, fine to medium grained loose quartz grains, sub-round to sub-angular, good sphericity, slightly calcareous off white matrix.	
2918	-	Missed	Missed. High ROP.
2921	-	Missed	Missed. High ROP.
2924	100	SANDSTONE: predominantly off white to very pale grey sample, paste, like rock flour, fine to medium grained loose quartz grains, sub-round to sub-angular, good sphericity, slightly calcareous off white matrix.	
2927	-	Missed	Missed. High ROP.
2930	100	SANDSTONE: predominantly off white to very pale grey cuttings, slightly calcareous cement, firm, crumbly, moderately hard cuttings in parts, fine grained, sub-angular to sub-round, good sphericity, moderately to well sorted, mottled with pale grey argillaceous material in parts.	
2933	100	SANDSTONE: predominantly off white to very pale grey cuttings, paste, like rock flour, slightly calcareous cement, firm, crumbly, moderately hard cuttings in parts, fine grained, sub-angular to sub-round, good sphericity, moderately to well sorted, mottled with pale grey argillaceous material in parts.	
2936	-	Missed	Missed.
2939	-	Missed	Missed
2942	100	SANDSTONE: predominantly off white to very pale grey cuttings, paste, like rock flour, slightly calcareous cement, firm, crumbly, moderately hard cuttings in parts, fine grained, sub-angular to sub-round, good sphericity, moderately to well sorted, mottled with pale grey argillaceous material in parts.	
2945	-	Missed	Missed
2948	-	Missed	Missed
2951	100	SANDSTONE: predominantly off white to very pale grey cuttings, paste, like rock flour, slightly calcareous cement, firm, crumbly, moderately hard cuttings in parts, fine grained, sub-angular to sub-round, good sphericity, moderately to well sorted, mottled with pale grey argillaceous material in parts.	
2954	-	Missed	Missed
2957	-	Missed	Missed
2958	100	SANDSTONE: predominantly pale grey argillaceous rock flour, occasionally white to off white cuttings/rock flour with fine, loose, transparent quartz grains. Grains were sub-round	Increased gamma ray to 105 API. Possible

	Tr	white cuttings/rock flour with fine, loose, transparent quartz grains. Grains were sub-round to sub-angular, moderately to well sorted, good sphericity with trace calcite. CLAYSTONE: medium to dark grey and red/brown cuttings, soft, sub-round to sub-blocky, pyrite locally associated with medium to dark grey cuttings.	105 API. Possible Triassic claystone.
2961	100	SANDSTONE: predominantly pale grey argillaceous silty rock flour, occasionally white to off white cuttings/rock flour with fine, loose, transparent quartz grains. Grains were sub-round to sub-angular, moderately to well sorted, good sphericity with trace calcite. Rock flour occasionally with dark grey streaks and micro-laminations. Rare firm, brittle light to medium grey cuttings.	Circulated bottoms-up due to hi gamma ray values on LWD log.
	Tr	CLAYSTONE: medium to dark grey and red/brown cuttings, soft, sub-round to sub-blocky, pyrite locally associated with medium to dark grey cuttings.	TD at 2961m

APPENDIX B

APPENDIX C

15/12-A-16 S Well Construction Montage

Measured Performance

Well Business Objectives				
Drill and complete well within assigned AFE budget				😊
Intersect reservoir through the specified RZ3 package targets				😊
Complete & perforate well on schedule to start injection as per forecast				😊
Deliver incremental reservoir of 16MMstb from A10 / A12A				😊

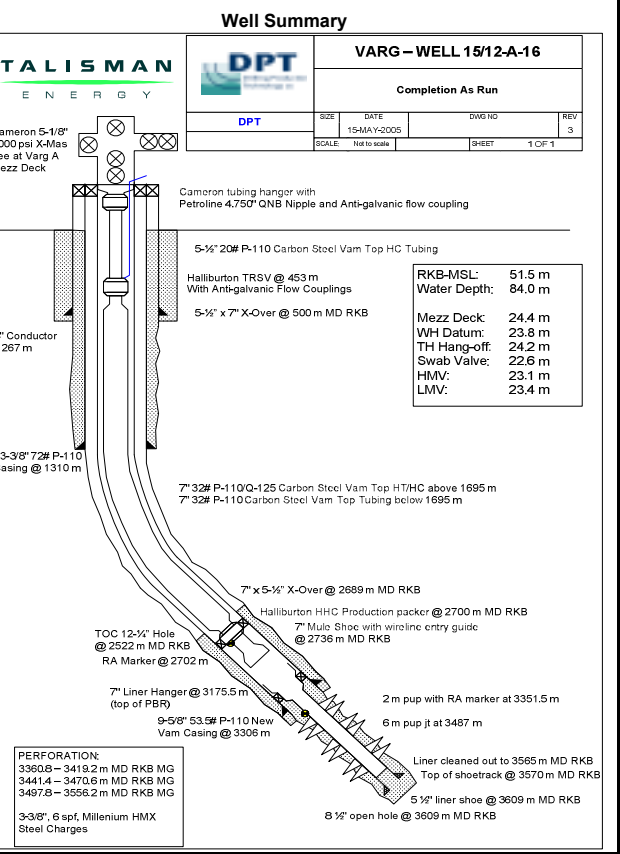
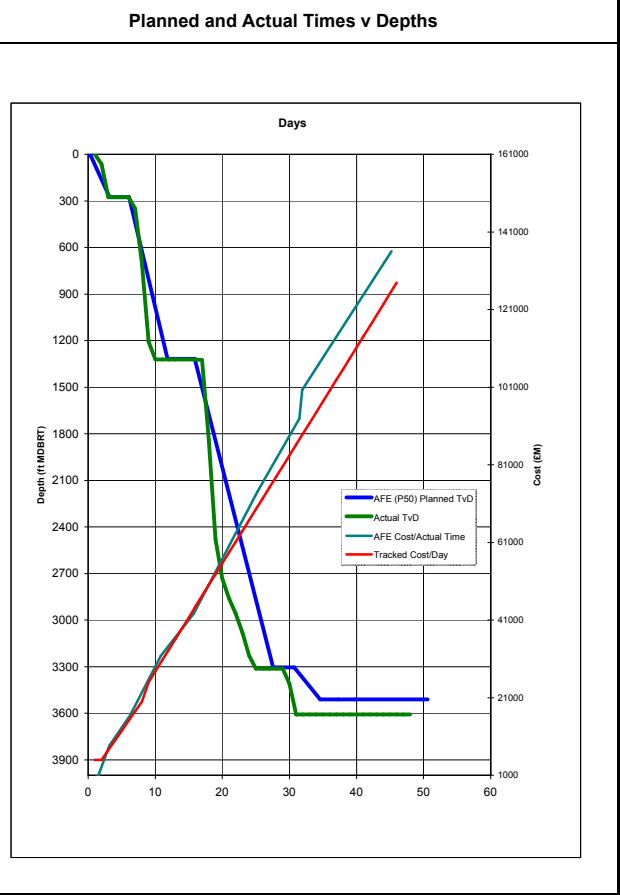
Headline Well Performance Summary					
Well on stream (based on AFE Injection forecast)	m3/d	Target	Actual		😊
Total Well Time	days	>6000	47.58		😊
Total Well Cost	krM	136	132,566		😊
Operational Performance (NPT, excl. WOW)	(%)	0	11.5		😊
LTIs		0	1		😞

HSE Performance Summary				
Don't hurt anyone or expose them to harm	Target	Actual		
Very high potential events	0	0		😊
High potential events	0	1		😞
Reportable injuries	0	1		😞
PSA reportable incidents	0	1		😞
Don't harm the Environment				
Acute spills to the environment	0	1		😞
Non-compliance to SFT Discharge permit	0	0		😊

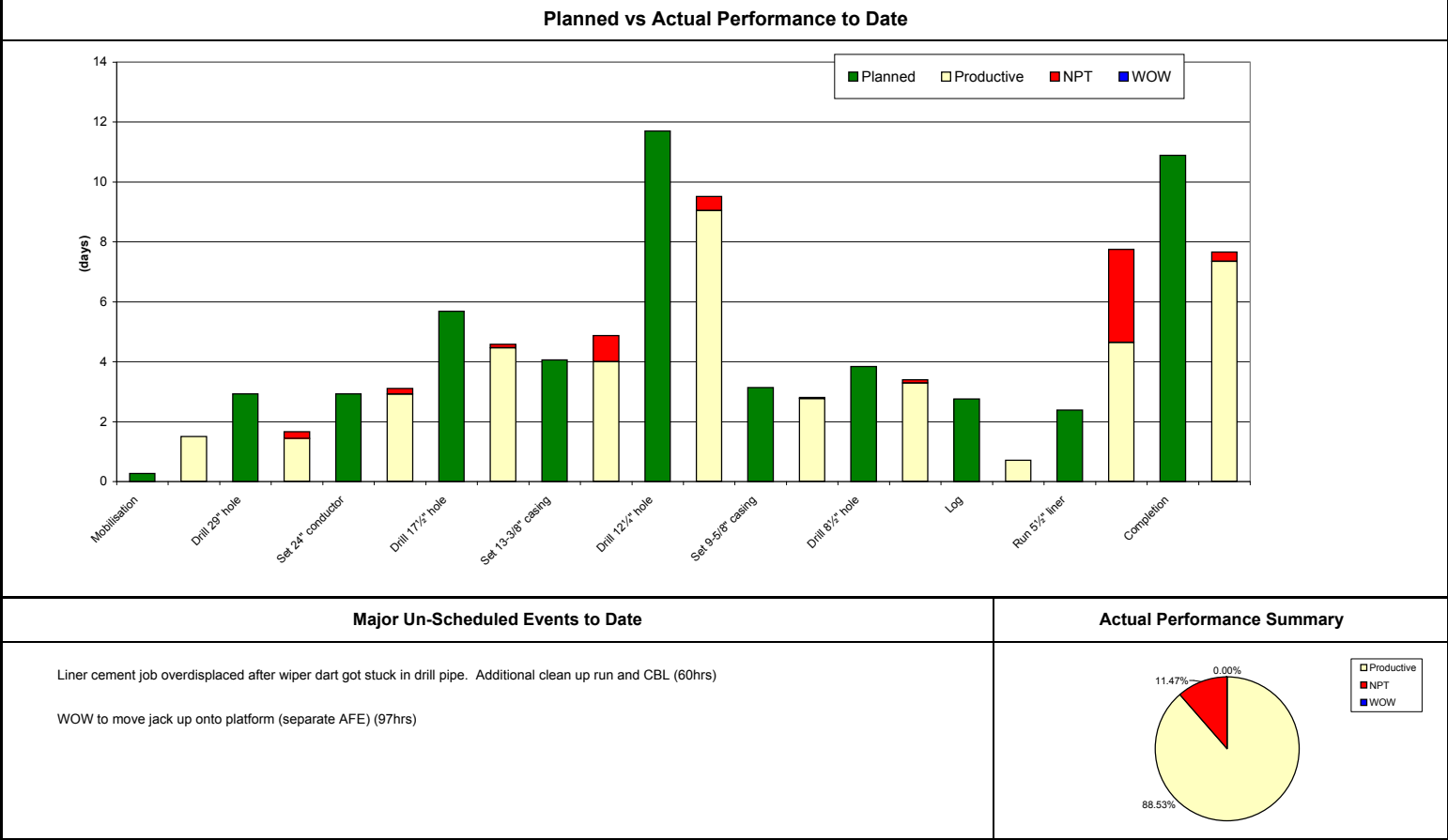
Key Performance Indicators				
Do what we said we would do	Target	Actual		
Obtain permits & issue well programmes on schedule	Yes	Yes		😊
Complete data acquisition programme per plan	Yes	Yes		😊
Objective reservoir targets intersected	Yes	Yes		😊
When we said we would do it (based on AFE approval)				
Commence Slot Recovery	N/A	N/A		
Commence drilling operations	Mar-05	29-Mar-05		😊
Complete completion operations	May-05	14-May-05		😊
In the time we said it would take				
P50 Slot Recovery Time	days	N/A	N/A	
Slot Recovery NPT (excl. WOW)	(%)	N/A	N/A	
P50 Drilling Time (excl. liner & clean out)	days	33.80	30.67	😊
Drilling NPT (excl. WOW)	(%)	15.0	6.66	😊
AFE Dryhole Ft/Day (incl. logging but excl. liner)	ft/day	87.31	113.27	😊
P50 Completion Time (inc. liner and clean out)	days	16.03	15.42	😊
Completion NPT (excl. WOW)	(%)	15	22.16	😊
At the cost we predicted				
Tracked Slot Recovery Cost	krM	N/A	N/A	
Tracked Drilling Cost	krM	92,166,458	88,968,888	😊
Tracked Completion Cost	krM	43,826,389	43,597,995	😊
Dryhole Cost per Foot (incl. logging, excl. liner)	kr/m	28,490	25,614	😊
Achieve the production predicted				
Incremental reserves	MMstb	16.0	16.0+	😊
Increase WI rates	m ³ /d	>6000	>6000	😊

Weekly Activity Update	

Time and Cost v Depth



Key Performance and Lessons for Future Wells



Potential Hazards
29" hole - Close proximity to adjacent wells
17 1/2" hole - Losses below the conductor shoe and in Utsira
17 1/2" hole - Gumbo plugging of surface equipment
12 1/4" hole - Differential sticking below BCU
12 1/4" hole - Unstable shale formations in a long open hole section
8 1/2" hole - Differential sticking in the reservoir
8 1/2" hole - High ECD / lost circulation

Well Specific Goals & Key Milestones			
Integrated project plan produced at start of operations planning	😊	9-5/8" set on depth isolating reactive clay & Kimmeridgian Sand	😊
Permits submitted on time	😊	All reservoir targets intersected, >96.5m of RZ3 encountered	😊
Locate rig without incident/accident	😊	8 1/2" hole drilled without Reservoir depletion related incident	😊
No obstruction encountered RIH 29" BHA	😊	Required biostratigraphical sampling acquired	😊
24" Conductor run on depth and cement in place per plan	😊	Pressure & Geological data acquired per plan	😊
17 1/2" drilled without direction correction run	😊	5 1/2" liner cemented in place as planned	😊
13-3/8" casing FIT achieved >1.60sg	😊	Casing and Liner Cleanout performed <54hrs	😊
12 1/4" hole section drilled with single BHA run	😊	Completion installed without component failures	😊
No wellbore stability NPT	😊	Perforate well and achieve 6000m ³ /d injection	😊
Comments, Key Learnings and Recommendations for Improvement			
Mobilisation of Rig to Platform under separate AFE			
Great focus required when cementing small liner			