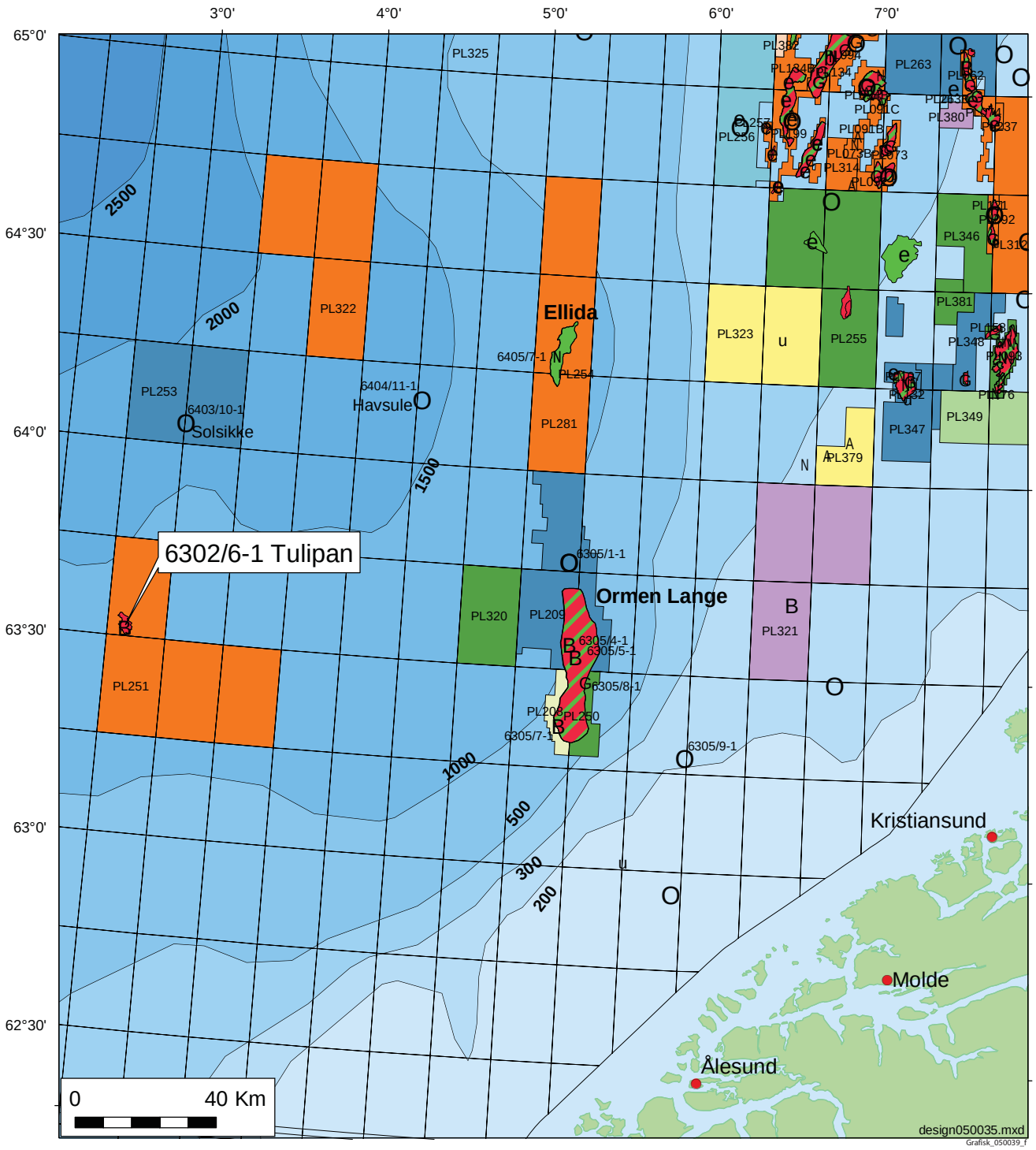
Final Well Report
Well 6302/6-1 & 6-U-1, PL251



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Final Well Report
6302/6-1 & 6-U-1
Tulipan PL251

EPDS-6302/6-1-012

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Tittel:
Final Well Report **6302/6-1 & 6-U-1** **Tulipan PL251**

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EPDS-6302/6-1-012		**Tulipan**

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Omhandler (fagområde/emneord): **General information** **Exemptions and non-conformances** **Health, environment, safety and quality** **Geology and formation data report** **Drilling operations report**
Merknader:

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1 Introduction

1.1 Well data record

Well name	:	6302/6-1	
Type of well	:	Wildcat	
Prospect	:	Tulipan	
Country	:	Norway	
Area	:	Norwegian Sea, Møre Basin	
License	:	PL 251	
Licencees	:	Statoil ASA (Operator)	70 %
		AS Norske Shell	10 %
		BG Norge AS	20 %

Drilling unit	:	Eirik Raude
Type	:	Semi submersible rig (DP)
Water depth	:	1260.5 m MSL
Air gap	:	25 m
On license	:	21.05.05
Rig released	:	07.10.05
Formation at TD	:	Springar Formation
Geographical coordinates	:	

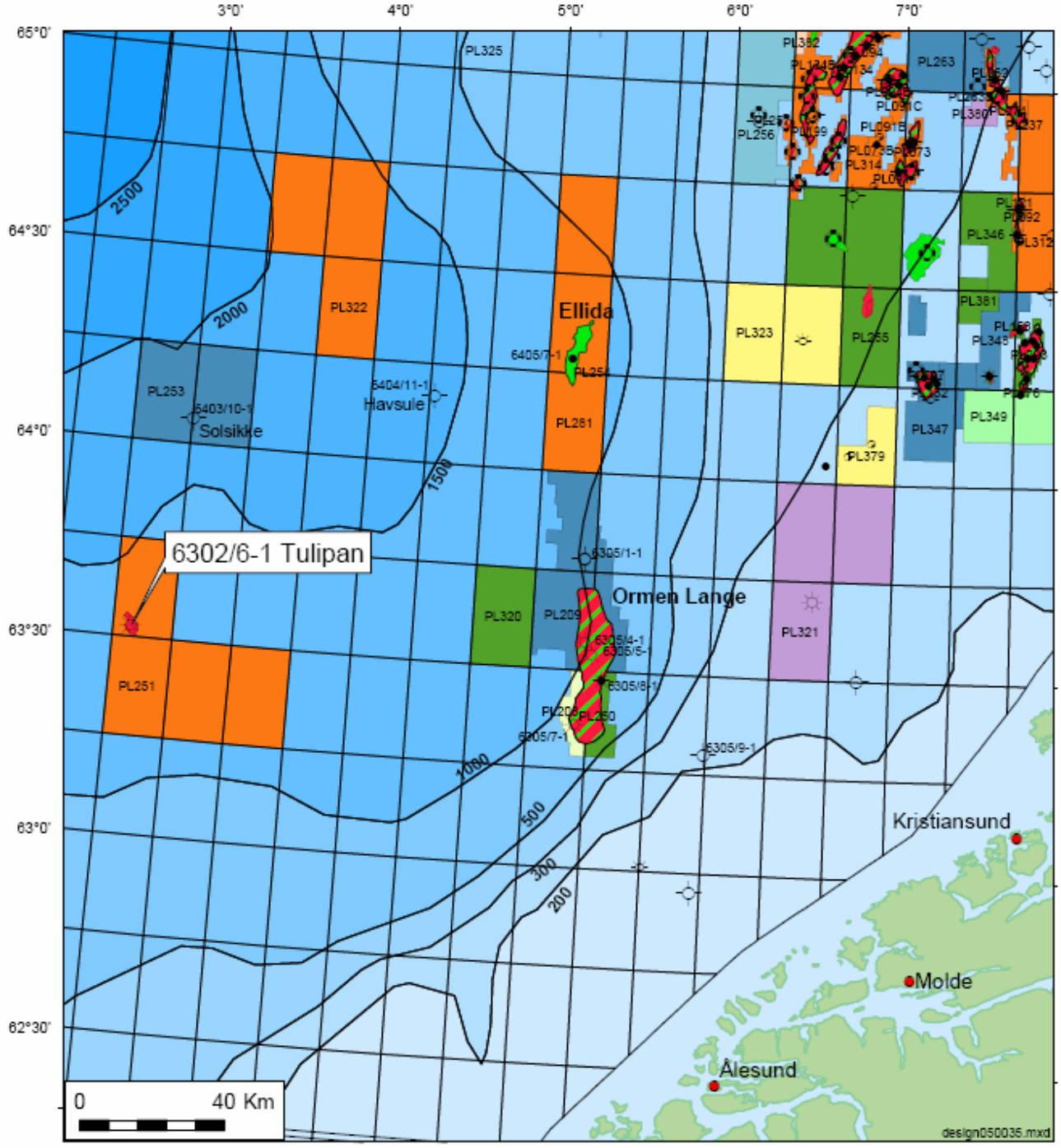
	6302/6-U-1	6302/6-1
Geographic coordinates (Surface)	63° 31’ 40.27” N	63° 31’ 38.43” N
	02° 45’ 53.55” E	02° 45’ 51.56” E
Datum / Spheroid	ED50 / INT.1924	
UTM coordinates	7 044 598 m N	7 044 541 m N
	488 305 m E	488 278 m E
Zone	Zone 31, CM 3°E	

Seismic location :

	6302/6-U-1	6302/6-1
3D survey ST0105	Inline 3779	Inline 3775
	Crossline 4826	Crossline 4826

All depths in this report refer to RKB (Rotary Kelly Bushing) unless otherwise stated. Also, unless otherwise written, the depths refer to loggers depth. Exception to this is chapter five, with refers to drillers depth unless other written.

Figure 1.1 Location map



1.2 Well objectives

The primary objective of the well was to test the potential for hydrocarbons and to evaluate reservoirs present. The primary target was Danian age sandstones in the Tang Formation. Possible additional sandstones in the Tare, Tang and Springar Formations constituted potential targets, also investigated by this drilling.

1.3 Result of the well

Well 6302/6-U-1 was spudded in a water depth of 1259 m MSL and drilled to a total depth of 2122 m. At this depth a water flow was observed in the lower part of the North Sea Fan. After pumping kill mud in several steps, the well was proven stable. The 20" casing was set and cemented with shoe at 2116 m. Water flow was still observed. The well was abandoned due to the ongoing water flow.

Well 6302/6-1 was then spudded 62.5 m southwest of 6302/6-U-1 and in a water depth of 1260.5 m MSL. No shallow gas was observed by the ROV at the wellhead. It was drilled to a total depth of 4230 m. The well penetrated rocks of Quaternary, Tertiary and Cretaceous age. TD of the well is in rocks of Cretaceous age in the Springar Formation (Fig. 4.2).

The well penetrated an interbedded sandstone reservoir section at 3901 m with a total thickness of approx. 100 m, slightly shallower than prognosed. A large data acquisition programme was performed. Three cores were cut in the Danian sandstone and MDT fluid samples were collected from four levels. A minor gas discovery was proven in the upper part of the reservoir section.

Unexpectedly, several thick limestone beds were found in the transition zone between the Palaeocene and the upper Maastrichtian. These beds were between 5 and 20 m thick and with a gross thickness of 35 – 40 m.

1.4 Drilling summary

1.4.1 Casing

Table 1.1 Casing programme summary

Casing	Shoe depth [mMD, drillers depth]	LOT / FIT [Equivalent mud weight]
Well 6302/6-U-1		
30”	1363	N/A
20”	2116	N/A
Well 6302/6 -1		
30”	1363	N/A
20”	1960	FIT: 1.29 sg
16”	2380	LOT: 1.60 sg + 1.46 sg
13 3/8”	3035	FIT: 1.49 sg
9 5/8”	3840	LOT: 1.72 sg

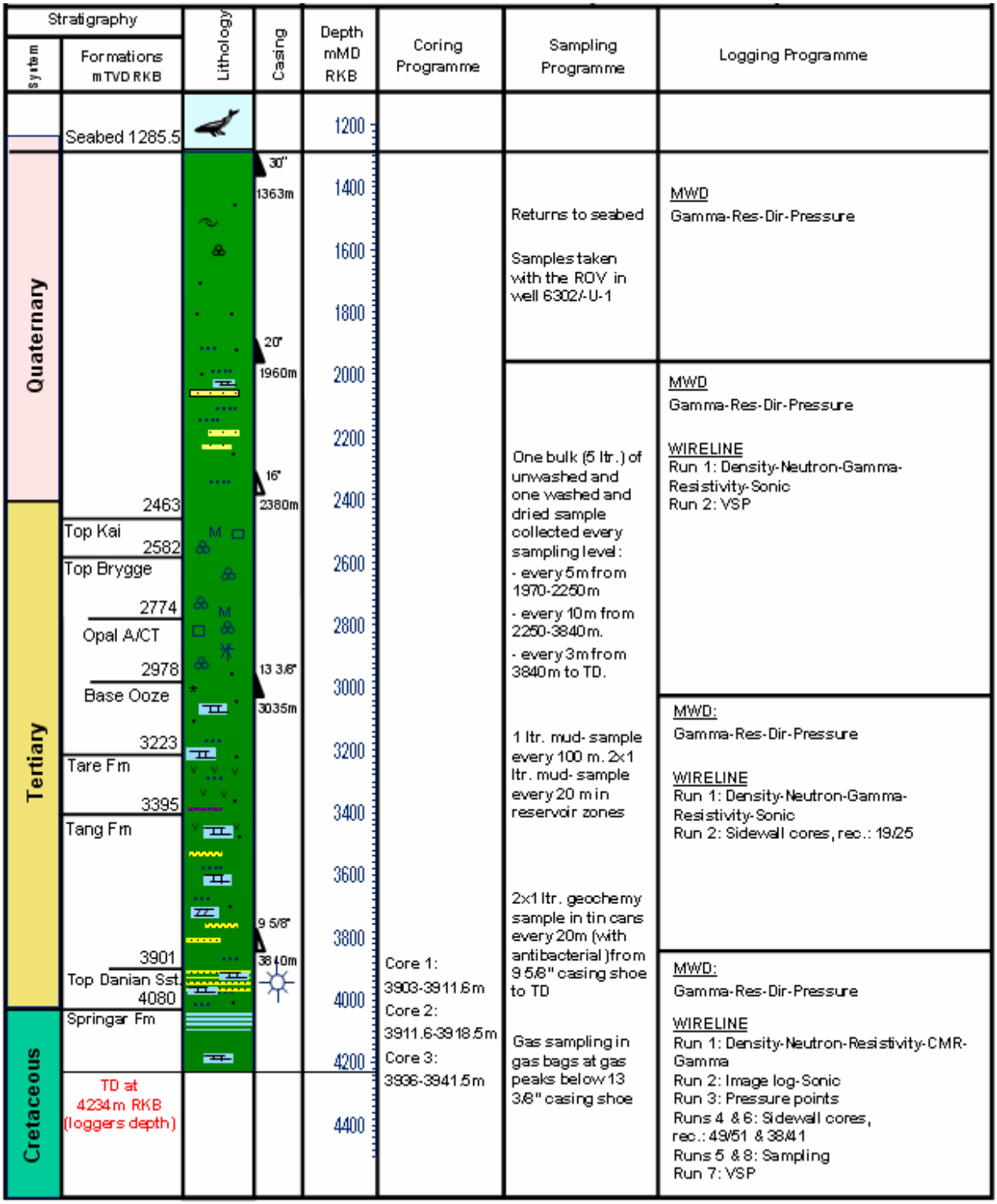
1.4.2 Drilling fluids

Table 1.2 Drilling fluids summary

Section	Section TD [m MD, drillers dpth]	Max mud weight [g/cm^3]	Mud type
Well 6302/6-U-1			
36”	1366	1.03	Seawater / high visc. Sweeps
26”	2122	1.03	Seawater / high visc. Sweeps
Killmud #1	2122	1.40	WBM mix of Glydrill, Bentonite and CMC
Killmud #2	2122	1.45	WBM with prehydrated Bentonite
Killmud #3	2122	1.47	Glydrill (KCl brine, Glycol and Polymers)
Well 6302/6 -1			
36”	1366.5	1.03	Seawater / high visc. Sweeps
26”	1965	1.03	Seawater / high visc. Sweeps
17”	2390	1.23	Glydrill Deepwater
12 ¼”	3842	1.40	Glydrill Deepwater
8 ½”	4230	1.56	Glydrill Deepwater

1.5 Data acquisition summary

Figure 1.2 Formation Evaluation



2 Exemptions

Table 2.1 Exemptions

WR0436	37495	07/02/05	Testing of wellhead connector to mwdp when testing 13 3/8" casing
WR0436	39271	23/09/05	Dispensation from 14 day interval test of BOP on Eirik Raude, 6302/6-1
WR0328	37496	07/02/05	13 3/8" casing will be run in openhole without a shear ram that can shear 13 3/8" casing using a DP vessel.
NPD	None	None	None

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

3.1 RUH

Table 3.1 Summary RUH

Type (colour code)	Synergi code	Number of
Red	1	0
Red	2	2
Green	4	22
Green	5	48
Yellow	3	3
Undefined		1
Sum		76

3.1.1 RUH details

WELLBORE: NO 6302/6-1

Table 3.2 RUH details 6302/6-1

Synergi no	Hazard	Description
333781	2	Synergi 333781 (Closed) - 15.08.2005 - Near miss - Pressure relief valve fell down from riser tentioner. Pressure relief valve on #3 Riser Tensioner blew off due to corroded fitting breaking. High pressure caused the 1.2 kg PSV to fall down 7.5 m from the accumulator and down to the deck just below the riser tensioner. High pressure air escaped to atmosphere with loud noise. Air pressure lost on #3 and #11 tensioner as they are tied in as pairs. Driller isolated affected Tensioners from MMI screen and called Subsea engineer. Main isolation valve on #3 tensioner was closed by Subsea and inspection done. Air pressure was increased on remaining tensioners to take up load of off-line pair. Relief valve was found to have a corroded fitting that had failed allowing pressure to shear fitting. New stainless steel fitting was fitted and unit returned to service. Ref. attached investigation report.
337487	3	Synergi 337487 (Closed) - 04.09.2005 - Near miss - Missing washer on starboard crane boom pin. The crane operator was doing the daily inspection of the starbord crane and found that one of the boom pins, lower outside of boom, has the larger washer gone and the pin was creeping out. The bolt for the washer was still attached with the seizing wire to the bolt welded to the crane. The upper pin bolt inside also seemed to be backing out so this was also tightened. This did result in a dropped object, washer 0.4kg, max drop hight 8 m, and could have resulted in personal injury or severe structural damage to the crane if the pin came out all together. Some other bolts for these pins were also tightened on 24/04, 16/05, 19/06 and 27/08. It is not the same pin all the time. This seems to be a re-occurring problem with the starboard crane only. There haven't been any reports of this happening in the port crane as of yet.
338113	3	Synergi 338113 (Closed) - 09.09.2005 - Accident - Squeezed thumb on drillfloor. Roughnecks were removing a 40 cm 15 kg jar clamp. When the lock nuts had been released the clamp dropped and the IP attempted to catch it and trapped his left thumb between the bottom of the clamp and the jar recess. IP split his nail from the impact and was sent onshore for further medical attention.

Synergi no	Hazard	Description
325338	4	Synergi 325338 (Closed) - 01.06.2005 - Other non-conformities - 20" casing threads make-up problems While running 20" 133ppf, N-80 casing with Tenaris ER (Antares) threads, problems were experienced making the string up according to specified parameters. The 20" string is run with JAM, illustrating the torque-turn pattern, and on several connections excess torque build-up was seen prior to shoulder torque indications. In total 7 joints were laid out during the job, after cross-threading or damaging threads in the process of making the string up. Alignment was checked and string redoped along the way to improve conditions without success. Both pin and box ends were observed with abnormalities (reference is made to separate reports from Weatherford). Specified MU values (not friction factor corrected) for the string is 18130/19600/21070 ft-Ibs for minimum/optimum/maximum respectively. The string was run with OCR 325 AG casing dope. Maximum MU torques was up to 32 kft-Ibs. The entire string was inspected in Kristiansund prior to shipment to the rig.
325543	4	Synergi 325543 (Closed) - 01.07.2005 - Other non-conformities - Electrical problem with valve for cement bulk tank C. Lost one hour prior to 20" cement job due to electrical problem with cement system discharge valve, 321-FCV-003, for cement silo C. The fault was found to be moisture in the positioning module of the valve, causing the module to short-circuit and making the valve in-operable.
328526	4	Synergi 328526 (Closed) - 17.07.2005 - Accident - Foreign object in eye from welding. IP had been on day shift, welding work. In the evening he feld that he has something in his right eye and could see it himself.He doesn`t know when he got it in to his eye He came to medic who tried to remove foreign object but couldn`t fix it. Consulted doctor in duty who ordered medicines and IP will visit eye specialist as he travel home 19.07.05
328571	4	Synergi 328571 (Closed) - 18.07.2005 - Other non-conformities - Cement premix (spacer) contamination Cement pre mix was contaminated with about 1 m^3 of Glydril mud, when left to hydrate. After filling up the 5 1/2" landing string, the assistant derrickman went line up Res A. and accidentally opened the wrong suction valve. When the pump was switched on he immediately noticed Reserve A going up and Active A going down. Pump was switched off and valves closed.
328774	4	Synergi 328774 (Closed) - 19.07.2005 - Accident - Barite accidentally vented to sea The derrickman had been mixing new mud. At 12:50 he shut down the mixing pump and all valves on the liquid side of the system. He then went to lunch. During lunch he remembered that he might not have closed the discharge valve on Barite silo C. He immediately went to Procon Unit and closed the discharge valve on Silo C. The silo had vented the barite into the surge can, which when full continued to fill the dust collector. When dust collector was full barite vented over the side. After recovering barite from dust collector and surge can it was discovered that 9 metric tonnes of barite had been vented to sea.

Synergi no	Hazard	Description
329555	4	Synergi 329555 (Closed) - 25.07.2005 - Condition - Legionella bacteria found in emergency showers 1) 13:10 Legionella is traced in emergency- shower, sack-store (Legionella pneu., type 1, 35/ml). Information is given orally by Kystlab, Kristiansund, after analysis at "Næringsmiddelkontrollen", Trondheim, based on sample from the 11th of July, 05. Written confirmation will arrive ASAP. 2) 13:15 OIM and Company doctor informed, He estimates/ researces for further actions. 3) Technical section leader informed. Close off emergency shower. 4) 14:30 In acceptance with OIM, all emergency-showerheads in the loop are dismounted and disinfected in a solution consisting of "Natriumhypokloritt", 0.1 dl/l, for 1 hour. 5) 15:30 Disinfection completed. 6) 16:00 Company-doctor has consulted "Folkehelseinstituttet" (Norwegian Health Authorities) for additional information. He advises on the issue. FHI is well known to similar conditions at other offshore-installations. This concluding is basically "a natural legionella- population". As long as the emergency-showers do not produce aerosols, legionella will not be enabled to contaminate the environment. Relevant showerheads have with large holes, for a rich flow, this prevents production of aerosols. FHI advices us to disregard the legionella-growth. 7) 16:30 OIM informed. Decided that water samples from all emergency-showers in the loop shall be sent to "Kystlab", Kristiansund, ASAP (26th of July).
329829	4	Synergi 329829 (Closed) - 27.07.2005 - Accident - Stepped into small opening in deck. Light injury to leg Deck crew was working on moving 4 m3 tanks (THSA tanks) on starboard aft riser deck. Several tanks were stored side by side. The tanks have graded plarforms on top. There are several holes\openings in the grating. This is due to covers etc. During this operation the spreader got jammed between two tanks. IP accessed the top of the tanks to release the spreader (løfteåk). While pulling/lifting the spreader IP took a step to the side. In doing this, he stepped down into an opening in the grating. This resulted in IP loosing balance and fell over landing on this bum on the grating. IP did not fall to a lower level. IP scratched skin off from front part, right leg. With at least four tanks in a square side by side, the risk of falling to deck was judged very unlikely. IP contacted Medic as per prodedure. After treatment, IP continued work.
333478	4	Synergi 333478 (Closed) - 16.08.2005 - Other non-conformities - Error on pressure while drilling sensor, showing 0.025 SG to much. The pressure sensur showed a static weight of 1.425 SG with 1.40 SG mud. While drilling, it seemed lik this error margin driftet and increased to 0.045 SG for a period and thereafter reduced back to 0.025 SG.
333766	4	Synergi 333766 (Closed) - 18.08.2005 - Near miss - Utilstrekkelig PA anlegg på helikopter som flyr personell til Eirik Raude. Pilotens instruksjoner i kabinen blir ikke hørt på grunn av utilstrekkelig PA anlegg.
337499	4	Synergi 337499 (Closed) - 04.09.2005 - Other non-conformities - Hydraracker electrical fault. Changed out Hydraracker load cell and re-calibrated set points on fingers.
337694	4	Synergi 337694 (Closed) - 07.09.2005 - Accident - Brann i badstu Badstuovn ble slått på, for bruk av badstu etter treningsøkt. Badstu er plassert like ved treningsrom. Under trening på tredemølle ble samme person som slo på ovn, oppmerksom på en stikkende lukt. Badstu ble undersøkt. Gjennom vindu på badstudør ble det oppdaget fyr i en trebøtte (med innvendig plastikk kapsling). Bøtten var plassert oppe på badstuovn. Samme person åpnet døren til badstu, vippet bøtte ned på gulvet, varslet kontrollrom, hentet vann og slukket ilden. Alarm og reaksjonslag ankom et par minutter senere. Badstu er utstyrt med varmedetektor, men varmeutviklingen var ikke på dette tidspunkt høy nok til at denne kunne aktiveres.
338108	4	Synergi 338108 (Closed) - 08.09.2005 - Other non-conformities - Separate run for testing the lower pipe ram (LPR) The BOP test tool has 4 1/2" IF threads and a x-over is therefore required in order to run the BOP test tool on 5 1/2" DP with HT 55 threads. With the x-over in place, the distance from the LPR to the nearest TJ too small and may damage the LPR if trying to close. Had to make a separate run with the BOP test tool on 5" DP. 5.5 hours down time in total.
338187	4	Synergi 338187 (Closed) - 09.09.2005 - Other non-conformities - Top drive upper IBOP failed pressure test. Unable to maintain high pressure on the upper IBOP. Pressure leaked.

Synergi no	Hazard	Description
325249	5	Synergi 325249 (Closed) - 30.06.2005 - Near miss - Electrical failure in combisteamer oven no.1 Observed smoke from the combisteamer oven no. 1 in the Galley. Reported to control room. Electrician checked the fuse. Extinguished the smouldering fire with a CO2 fire extinguisher. Opened the oven and checked for damage. Temporary conclusion the fire was caused by an electrical failure.
325252	5	Synergi 325252 (Closed) - 30.06.2005 - Accident - Burn injury right forearm After tumble drying clothes, IP was picking out clothes from the dryer and got burn injury on right forearm when contact with the hot thumble. The thumble dryer had normal temperature during drying and after.
325387	5	Synergi 325387 (Closed) - 30.06.2005 - Near miss - Container lid blew to sea Lid on container ("Billy Pugh cont") for safety vests came loose and flew over the bridge roof and into the sea when the helicopter was landing. The lid has round shape and is 2 m in diameter. No risk for injury to personnel, as everybody was waiting inside for the helicopter to land. The lid was probably loose because someone had inspected the container without properly securing the lid afterwards. the content of the container has not been in use the last year and last maintenance was performed 10/05/05.
325701	5	Synergi 325701 (Closed) - 02.07.2005 - Other non-conformities - Damaged canvas ratchet strap fell to sea. One riser joint buoy module was found cracked when inspected on drillfloor and secured with a canvas ratchet strap prior to being lowered through spider/gimbal. Driller was, by personnel on the moonpool trolley, informed that while lowering the string the canvas strap had fallen into the sea. It is standard practice to remove all personnel on drillfloor and moonpool prior to commencing lowering the riser. The buoy module was secured with another ratchet strap installed in the moonpool.
326407	5	Synergi 326407 (Closed) - 05.07.2005 - Near miss - Leak in valve led to accidental release of 13 m3 oil-contaminated water(42ppm). From 1430 the 4th to 0230 the 5th of July, approx 13 m3 of 42ppm contaminated water leaked from active mix tank. This tank is used by Oiltools for treatment of contaminated water. The leak was observed by several functions from different companies, but was not considered by these to be abnormal. It was believed the volume drop was due to OilTools transferring to another tank. Flushing and cleaning of Reserve C mud pit and transfer of fluid between different pits was ongoing in the same period the leakage occured.
328271	5	Synergi 328271 (Closed) - 15.07.2005 - Near miss - Toxic gas alarm in the shaker house At 23:02 hrs the Toxic Gas Alarm was activated. A PA announcement was issued by the bridge stating the alarm was coming from the Shaker House. All POB were informed to avoid the Shaker House area and to proceed to their Muster Stations. Emergency Response Teams assembled, donned SCBA and waited on instruction from the bridge. Once the Full Muster was accounted for, the ERT's masked up and checked the Shaker House and surrounding areas with gas detectors. There was no indications of H2S at this time, Bridge was informed, that just prior to the Toxic Gas Alarm Oiltools had started to transfer water from the Non hazardous waste tank and hazardous drain tank to the Chemical 'A' Mud Pit for treatment by Oiltools, Chemical ' A ' Mud Pit was checked there were no readings of gas. It was then determined that stagnate water in the hazardous waste Tank had developed some H2S through the process of natural organic decay of dead bacteria and micro-organisms in the water. Due to the negative pressure on the mud pits caused by the HVAC exhaust system tied into each mud pit, the H2S gas that was breaking out of water through agitation as it was being pumped into Chemical ' A ' Mud Pit was detected by the H2S Gas Detectors in the HVAC ducting.
329236	5	Synergi 329236 (Closed) - 01.07.2005 - Other non-conformities - Problems with final MU of 20" casing Used several attempts before able to get finale torque shoulder on 20" casing.
329239	5	Synergi 329239 (Closed) - 22.07.2005 - Other non-conformities - Fault on Hydra racker Malfunction on electrical cable on Hydra racker. Troubleshooting and repair.
329245	5	Synergi 329245 (Closed) - 22.07.2005 - Other non-conformities - Hydraulic leak in auto elevator Observed Hydraulic leak in auto elevator
329276	5	Synergi 329276 (Closed) - 24.07.2005 - Other non-conformities - Re-calibrated Hydra racker Re-calibrated Hydra racker
329279	5	Synergi 329279 (Closed) - 24.07.2005 - Other non-conformities - Fault on Hydra racker Electrician completed repair on Hydra racker and function tested same.
329330	5	Synergi 329330 (Closed) - 24.07.2005 - Other non-conformities - Dart sub left out of the 14,75 inch. drilling BHA. The dart sub was left out of the 14 3/4" drilling BHA and was discovered by the crew coming on tour, when the bit was at the depth of 1750 m.

Synergi no	Hazard	Description
330183	5	Synergi 330183 (Closed) - 30.07.2005 - Other non-conformities - Wrong depth input when zero the wireline tools at surface. Wrong depth input when zero the wireline tools at surface.
331098	5	Synergi 331098 (Closed) - 02.08.2005 - Near miss - Toxic gas alarm in shaker house Toxic gas alarm activated during transfer of water from the non hazardous waste tank and hazardous drain tank to the chemical "A" mud pit for treatment by Oiltools. Stagnate water in the hazardous waste tank had developed H2S through the process of natural organic decay of dead bacteia and micro-organisms in the water. Due to the negative pressure on the mud pits caused by the HVAC exhaust system tied into each mud pit, the H2S gas that was breaking out of water through agitation as it was being pumped into chemical "A" mud pit.
331183	5	Synergi 331183 (Closed) - 04.08.2005 - Other non-conformities - Riser crane hook caught and damaged railing When using the riser gantry crane, the operator was on the port side of the rig and began to move the riser gantry crane to the starboard side of the rig. The forward arm on the riser crane was not raised enough to clear the railing on the slip joint cradle and as a result the hook on forward arm hooked into and damaged the railing.
331184	5	Synergi 331184 (Closed) - 03.08.2005 - Other non-conformities - Unable to break over-torqued saver sub on top-drive. Had to remove top drive torque wrench and break out saver sub with manual tongs. Installed new saver sub and reinstalled torque wrench - resulted totally in 3hrs downtime.
331374	5	Synergi 331374 (Closed) - 05.08.2005 - Other non-conformities - Respooled slack drill-line. While picking up joint of 13 3/8" casing off forward pipe skate the pin end protector got jammed in the hydraulic pipe lifter in the middle of the pipe skate. The driller immediately noticed the joint had jammed and put the joystick into the middle position slowing the drawworks down but had to put the joystick into park position to prevent damaging the casing, elevators etc. This caused the line to jump a wrap on the drawworks. The drawwork had to be hung off to respool the slack line on the drum. No injury or equipment damage. Lost 1 hr rig-time.
331377	5	Synergi 331377 (Closed) - 05.08.2005 - Other non-conformities - Damaged hydraulic hoses on forward knuckle boom crane. While using the knuckle boom crane to lift 13 3/8" casing up to the forward skate the "Yoke" on the crane was rotated more than 360 degrees and as a result the hydraulic hoses became twisted to a degree requireing repair. There were no leaks from the hoses, but they sustained enough damage requiring replacement. Limit switch has not been working properly.
331412	5	Synergi 331412 (Closed) - 05.08.2005 - Other non-conformities - Space-out problems during landing of 13 3/8" casing When landing 13 3/8" casing, it was believed the hanger was not landed due to landing string stretch not being accounted for in space-out calculations. Reference is made to attached file for further explanations of the background and incident.
331820	5	Synergi 331820 (Closed) - 08.08.2005 - Other non-conformities - Bent a single of drill pipe in the effort to recapture the stand of pipe that was loose in the derrick. At 06:20 hrs The Tourpusher who was relieving the Driller for breakfast was running the Drawworks and the crew was tripping in the hole. The TP ran the blocks up to the pick-up point, with the blocks in the retracted position, to pick up the next stand of pipe. The Trip Tank was being emptied and after several minutes passed waiting for the tank to empty, the TP said he was moving the blocks out to get the pipe. The A/D who was operating the Hydraracker misunderstood, and thought the TP had said he had the pipe. At that point the A/D released the pipe. A single of drill pipe was bent in the effort to recapture the stand of pipe that was loose in the derrick.
331821	5	Synergi 331821 (Closed) - 07.08.2005 - Other non-conformities - Stand fell out and leaned against a beam in the derrick. Operator did not pay enough attention to what he was doing, finger was closed before stand was in place and when hydraracker was opened, stand fell out and leaned against a beam in the derrick. Stand was straigtened by use of a tugger and set back in finger board.
332347	5	Synergi 332347 (Closed) - 09.08.2005 - Accident - Cut in finger while working in engine room. While dismantling lube oil cooler in engine room A, person got a cut in his right ring finger from the sharp edge of one of the cooling plates. Person was not wearing gloves.

Synergi no	Hazard	Description
337489	5	Synergi 337489 (Closed) - 05.09.2005 - Other non-conformities - Pulled 2 stands with valve from trip tank closed Between 0530 and 0600 the well was flow checked prior to POOH. After 2 stands were pulled it was noticed the hole had not taken the correct amount of fluid. Investigation was done and a manual operated valve (by the HP mud standpipe manifold) on the discharge line from the trip tank to the well was found to be closed. This valve was immediately opened and everything returned to normal. Due to the fact the valve was on the line from the trip tank to the well and the line from the well to the trip tank had no obstructions, a gain in the well would have been noticed. Losses in the well would not have been noticed.
337500	5	Synergi 337500 (Closed) - 04.09.2005 - Other non-conformities - Crown mounted compensator. Re-calibrated crown mounted compensator due to out of alignment.
338639	5	Synergi 338639 (Closed) - 13.09.2005 - Other non-conformities - Unable to break out top drive saver sub for connection Unable to break out top drive saver sub for connection. Laid down one single, broke saver sub connection with manual tongs.
339290	5	Synergi 339290 (Closed) - 15.09.2005 - Other non-conformities - Stand of Drill Pipe Fell out of the finger board. At 07:30 hrs While back reaming out of hole with 8 ½" Drilling Assembly a previously racked stand fell out from the finger board and across the Derrick. This was the result of a lack of communication i.e. inadequate handover between the two men operating the Racking system. The Rack system had been used in manual mode and when the stand in question was inserted the operator failed to physically insert the stand in to the computer. The new operator unaware of this went to automatic mode and when he went to insert the next stand the finger holding the stand, which had previously been racked, opened allowing it to fall across the Derrick.
339663	5	Synergi 339663 (Closed) - 18.09.2005 - Other non-conformities - Problem to start a generator for the MSCT tool Problem to start a generator for the MSCT tool. Documentation for maintainance was also missing. Parallel maintenance and repair work has been taken into concideration.
342621	5	Synergi 342621 (Closed) - 29.09.2005 - Other non-conformities - Seawater accidentally pumped into trip tank Observed increasing trip tank level after pumping hi-vis pill prior to cementing operation. Shut in well and identified increase in trip tank due to open isolation valve from seawater pump into mud pump. This caused seawater going through mud pump, down booster line into riser and from there to trip tank.
343038	5	Synergi 343038 (Closed) - 02.10.2005 - Other non-conformities - Lost pressure on accumulator bottles to LMRP. Installed test cap and re-pressurised accumulator bottles to 5000 psi.
343441	5	Synergi 343441 (Closed) - 23.09.2005 - Other non-conformities - Function test of BOP was not performed Function test of BOP was not performed accoring to required test interval.

WELLBORE: NO 6302/6-U-1

Table 3.3 RUH details, 6302/6-U-1

Synergi no	Hazard	Description
319756	2	Synergi 319756 (Closed) - 03.06.2005 - Near miss - Cementhose rotated uncontrolled on drillfloor. Driller picked up string with compensator open in preparation to release 36" casing running tool. the Cement hose that was laid across the drill floor and had been wrapped around the drill string (clock wise) ready for the rotation of string. Pipe was rotated to the right. The Roughnecks walked the hose around as the pipe was being rotated, when it was noted that toque was increasing on the landing string, but the Cam Actuated Running tool was not turning at seabed. Driller was distracted when requested to change his left hand monitor (MMI 1) to the ROV picture so that another party could see. This took away his Topdrive (torque) screen. The Driller had the ROV picture on his right hand screen which could not be observed by other personnel involved in the operation. A total of 5 turns was rotated into the string as instructed, he stopped the rotation and due to changing screens he did not have a torque reading on the landing string. The string rotated Counter Clock Wise and this caused the Cement hose to unwind off the string, the rotation brake was applied but the string rotated three turns CCW. The roughnecks quickly moved back away from the hose. Driller checked crew OK and the operations continued until the casing running string was in a safe position. The job was then stopped and a Time out for Safety called. Held meeting with crew involved to identify problems to eliminate repeat of incident.
320011	3	Synergi 320011 (Closed) - 05.06.2005 - Near miss - Trolley (9 kg) fell down 4,5 m from beam. Job task was to move 20" casing slips from heavy tool store to the rig floor. Roughneck was trying to move the beam roller/trolley to the top of the stairs so he could install Chain Hoist. He was standing on the walk way pushing it towards the Heavy Tool store door with a broom handle, when the beam roller/trolley fell off the rail falling 4.5 mtr to the rig floor, the weight of the roller was approximately 9 kg, no one was in the area at the time.
317759	4	Synergi 317759 (Closed) - 25.05.2005 - Accident - Pinched finger during moving of manual slips on drill floor During moving of manual slips to its temporary stowage position on drill floor, IP caught his fourth finger in between the slips and a steel table.
318025	4	Synergi 318025 (Closed) - 25.05.2005 - Near miss - Gas alarm (H2S) in shaker house Toxic gas alarm activated in the shaker house while transferring slop-water from non hazardous waste tank to the chemical 'A' mud pit, for treatment by Oiltools.
318194	4	Synergi 318194 (Closed) - 26.05.2005 - Near miss - Nauseating odour from bulk silos During a routine inspection of the bulk silos (level 7) an overwhelming odour came out of the silo when the pump man opened the hatch.The pump man became nauseated and immediately vacated the area, proceeding up the ladder to level 1 to access fresh air.
318345	4	Synergi 318345 (Closed) - 27.05.2005 - Near miss - Damaged wire sling on heavy lift After the 36"x30" low pressure housing (26 tonne) had been lifted onboard it was observed that one of the wire slings was damaged. 9-10 strands was apart and the area was deformed. The wire sling was certified April 2005. Certificate no. 4288868.1
318578	4	Synergi 318578 (Closed) - 28.05.2005 - Near miss - 20" casing not properly secured for boat transport. Under transit from KSU to Tulipan location the top row of the 20" casing came loose. When this was identified three 20" joints were rolling around. The cargo was insufficiently seafastened with wooden chocks.
319754	4	Synergi 319754 (Closed) - 03.06.2005 - Near miss - 2" bleed off valve on 30" conductor opened accidentaly by ROV tether The tether for the ROV got under the arm fopr the 2" bleed of valve on 30" conductor running tool while waited on cement.
320679	4	Synergi 320679 (Closed) - 07.06.2005 - Other non-conformities - Tulipan well flowing. Downtime: 51.5 hrs. Statoil During drilling 26" hole at 2122 m, observed with the ROV that the well was flowing. No gas, only water-liquid was flowing.
321085	4	Synergi 321085 (Closed) - 09.06.2005 - Accident - FAI finger squezze in door frame IP squeezed his left thumb inside door, when trying to lock it, using his right hand on the door handle. This manoeuvre was done promptly as the wind conditions kept the door open.

Synergi no	Hazard	Description
343673	4	Synergi 343673 (Closed) - 04.10.2005 - Other non-conformities - Lost anchor # 8 Lost anchor # 8. Located anchor on seabed using ROV.
317733	5	Synergi 317733 (Closed) - 22.05.2005 - Near miss - Hydraulic spill on drill floor Rigged up top of head of Hydra racker, secured to aft skate and DFMA (drill floor manipulator) while hooked to tugger. When personnel returned from lunch, it was found out that the skate had been moved and hydraulic hose ripped off DFMA and oil was leaking onto deck.
317749	5	Synergi 317749 (Closed) - 24.05.2005 - Accident - Minor injury to eyebrow/forehead Removal of plastic wear pads from the ram blocks on the BOP. This entailed removing plastic retainer screws. While attempting to chisel screw head off, the chisel bounced back and struck IP between rim of hard hat and safety glasses. This resulted a small cut on IP's right eyebrow.
318343	5	Synergi 318343 (Closed) - 27.05.2005 - Near miss - Fitting on Hydra racker fell 4,3 m and landed on drill floor While doing maintenance on the hydro racker on the drill floor using the casing stabbing basket elevated 4,5m above the drill floor, a "Quick connect" fitting (weight 80g) at the end of a accessory hose was pinched and fell down 4,3m to drill floor.
320001	5	Synergi 320001 (Closed) - 03.06.2005 - Accident - Got a little cut in right hand while working IP was removing the cover bolts on a thruster LO filter housing when his hand contacted an exposed corner of locking tab which caused a cut. Cut about 1 cm in his right hand, one sting sewed by medic.
320025	5	Synergi 320025 (Closed) - 06.06.2005 - Other non-conformities - Lost signal from rig server to MWD surface system Lost signal from rig server caused no depth tracking in the MWD surface system. Since the system shut down exactly midnight, the problem may have been caused by automatic maintenance on rig server Downtime: 0,5 hrs. Ocean Rig
321117	5	Synergi 321117 (Closed) - 10.06.2005 - Condition - Personell ventet på heliport i sammenhengende 10 timer Avgang helikopter fra Kristiansund ble utsatt flere ganger, medførte at personell ble sittende på heliport fra kl 11:00 og ankom Erik Raude kl 22:45. Noen av passasjerene hadde reist siden kl 04:00 om morgenen og gikk rett på nattskift.
321960	5	Synergi 321960 (Closed) - 14.06.2005 - Accident - FAI hit knee while walking IP slipped in stairway on the cement unit while working. IP hit his knee in the lower part of the handrail. IP held both hands on the handrail and did not fall.
322318	5	Synergi 322318 (Closed) - 16.06.2005 - Other non-conformities - Small leakage in starboard valve pack on ROV during last two weeks. Loss of approximately 5 litres of hydraulic oil to sea. Have received replacement parts, but due to high activity, repair has not yet been possible. Repair will be carried out as soon as time/operation permits. Covers on valve pack to be changed from plexiglass to aluminium type due to operational depth.
322412	5	Synergi 322412 (Closed) - 18.06.2005 - Other non-conformities - Unable to regulate throttle on cement unit Unable to regulate throttle on cement unit for pressure testing BOP choke, kill and conduit line. CEM-11 procedure not followed.
322681	5	Synergi 322681 (Closed) - 17.06.2005 - Other non-conformities - Problems during cement operation Problems during the 20" foam cement job the silo in use (C) encountered problems with the Larox valve. The Derrickman immediately brought silo D online and approximately 1 tonne of cement was transferred when the operation was shut down to allow Halliburton cementers to work on the knife valve on the surge tank which was plugging up. The Derickman partially purged the lines. When given go ahead to continue transferring cement it was discovered that the line was blocked. Took fifteen minutes to clear. Reason for blockage was that lines had not been fully purged due to the fact that the Derrickman was worried about cement discharge overboard. This came from operating guide for the Barents Sea. This is not relevant here.
323244	5	Synergi 323244 (Closed) - 19.06.2005 - Other non-conformities - Damage to TDS Link Tilt While laying out Riser handling equipment the 1000 tonne bails were placed on the Aft Skate and the Driller lowered the Travelling Block to allow the crew to remove the bails from the Bail Eyes on the Travelling Block. While lowering the Bails came into contact with the Link Tilt Slave Arms causing the bolt eyes to splay apart.

Synergi no	Hazard	Description
323245	5	Synergi 323245 (Closed) - 18.06.2005 - Near miss - Chemical arriving without MSDS or risk assessment While performing weekly chemical stock new chemical were observed in store. 1) Unitor Metal Brite MB. This was not a chemical originally submitted to Logichem. There was no MSDS for this chemical. The chemical is not listed on ER chemical list.
323400	5	Synergi 323400 (Closed) - 22.06.2005 - Near miss - Marine riser centraliser fin sheared off and fell into sea While pulling riser joint # 52 through the rotary table a centraliser fin, at approximately mid joint, was sheared off and fell through the moonpool, struck the 100 T dolly, and fell into the sea. The driller had stopped pulling and had given go ahead for the personnel working on the 100 T dolly to disconnect the mux cable. Just after started moving the 100 T dolly the fin fell through on the port side and ricochetted off a lower set of fins towards the moonpool platform. Personnel were on the starboard side moonpool platform approx. 4 m from the path of the fin. Marine riser centraliser fin dimensions: L=457,2 mm W= 381 mm T= 25,4 mm. Estimated weight=7kg.
323479	5	Synergi 323479 (Closed) - 20.06.2005 - Other non-conformities - ROV winch failure While recovering the ROV, the level wind on the ROV winch stopped. As a result, the ROV was pulled on deck without the level wind working. As ROV was landed on deck, a noise was heard from the ROV winch. The diamond screw on the winch had broken loose from one of the securing bearing.
343619	5	Synergi 343619 (Closed) - 23.06.2005 - Other non-conformities - Trouble shot and rebooted V-ICIS system Trouble shot and rebooted V-ICIS system
343620	5	Synergi 343620 (Closed) - 23.06.2005 - Other non-conformities - Rupture in MUX outer casing Rupture in MUX outer casing
343621	5	Synergi 343621 (Closed) - 23.06.2005 - Other non-conformities - Fractured line on riser handling tool Fractured line on riser handling tool
343664	5	Synergi 343664 (Closed) - 04.10.2005 - Near miss - Angle bar ripped off and fell down During lifting operations in provision handling room a container bumped into an angle bar and ripped it off. The angle bar fell down to the deck below (approx. 6,2m). The weight of the angle bar is 6.2 kg. The area was dedicated to provisiton container handling and access was restricted. The flagman was located in the other side of the room controlling the operation. The door into the room was closed. The angle bar is identified to be a support for an old deluge pipe system. The deluge pipes were re-located due to damage from lifting operation and the support is a remainder from this system.

3.2 Experience listing

Subject:	Logistics operations in KSU
Section:	NO 6302/6-U-1, MOBILIZ
Rep date:	17.11.2005
Keywords:	PLANNING

Description:
Took rig into KSU harbour for more efficient logistics operation.

Not so vulnurable to rough sea.

In general, a positive experience. But, took too much equipment onboard.

Future recommended solution:
Arrange a pre-logistics meeting upfront.

Subject:	Marker buoys rated for actual water depth
Section:	NO 6302/6-1, 42" x 36"
Rep date:	17.10.2005
Keywords:	ROV

Description:
All 4 marker buoys collapsed at 1100m. No extra set of marker buoys on the rig.

Immediate solution:
Aquired new marker buoys
Future recommended solution:
Have double set of marker buoys on the rig. New type of marker buoys that are rated for 1800m water depth. The marker buoys should be made of the same buoyancy material as used on the ROV.

Subject:	Evaluate running conductor with 1x30" side door elevator and slips as an alternative to running elevator to elevator
Section:	NO 6302/6-1, 42" x 36"
Rep date:	18.10.2005
Keywords:	CASING/LINER

Description:
Evaluate running conductor with 1x30" side door elevator and slips as an alternative to running elevator to elevator. This will be quicker and maybe save us an hour in total. Running elevator to elevator means landing the conductor joint in the elevator on rotary, removing the bails from the landed elevator and installing the next elevator for picking up the next joint and over and over again. It is far easier to run with manual slips and elevator. The last joint would be landed on the elevator for making up the inner string with the c-plate and hand-slips landed on the elevator. Especially in bad weather, it is critical to use slips instead of two side-doors for proper securing of the string hanging in rotary.

The inner string is easily made up with the roughneck as the elevation function (max 7m) exceeds the height (1m) of the conductor and inner string slips and c-plate.

Subject:	Include a Stability section leader/DPO in the plannning phase to accomodate DP operations
Section:	NO 6302/6-1, 42" x 36"
Rep date:	18.10.2005

Keywords: ROV

Description:
Lack of knowledge regarding DP positioning operations. Time for positioning operations was not included in the time planner. Operations did not commense as soon as desired when rig at location.

Future recommended solution:
It is advised to include a Stability section leader / DPO in the detailed planning of future deep water wells drilled on DP to accommodate the details of DP operations in the well programme. It is also advised that the Rig owner and ROV company establish a direct line of communication to clarify exactly what is required from both parties.

Pre-installation of the transponders on the seabed ? By use of a boat.

Challenge spud coordinate accuracy ? Can this be challenged to save time?

MU and start tripping BHA should be performed at the same time.

Subject:	Remove mouse hole prior to installing bulls-eye brackets on the conductor
Section:	NO 6302/6-1, 42" x 36"
Rep date:	18.10.2005
Keywords:	CASING/LINER

Description:
For installation of the bulls eyes brackets, it is important that the mouse hole is removed prior to running the conductor to be able to run the flat car (moon pool working platform) all the way in under rotary and be able to easily install the bracket.

On Tulipan, the mouse-hole was installed and it was awkward to install the brackets since the platform was not run all the way over to the conductor.

Future recommended solution:
To be included in Conductor running DOP

Subject:	Formation at conductor shoe not sufficient strength to withstand hydrostic pressure from cement
Section:	NO 6302/6-1, 42" x 36"
Rep date:	17.11.2005
Keywords:	CEMENTING

Description:
Tuned light cement was selected for the conductor cementing job due to low formation strength. Had to abort cementing and not sufficient tuned light for a second cement job.

G-cement not appropriate for conductor cementing.

Immediate solution:
G-cement
Future recommended solution:
Evaluate tuned light cement as standard cementing system for conductor cementing on deep water wells.

Subject:	Divert potential gas away from the wellhead to avoid hydrates
Section:	NO 6302/6-1, 42" x 36"
Rep date:	17.11.2005
Keywords:	WELLHEAD/ASA

Description:

A clamp/hose can be fitted on the wellhead, around the cement return holes. Potential gas from the formation can then be directed away from the wellhead to avoid hydrates.

Future recommended solution:
Evaluate for future deep water wells.

Subject:	Use Glydrill DW mud in the bottom of the hole before running casing (SWF)
Section:	NO 6302/6-1, 26"
Rep date:	18.10.2005
Keywords:	DRILLING FLUID SOLIDS CONTROL

Description:
Use Glydrill DW mud in the bottom of the hole before running casing seemed to prevent the mud level in the 26" hole to drop while RU to run casing. This was done after having killed the SWF on 6302/6-U-1 and heavy mud was left in the hole prior to run 20" casing. Mud was seeping into the formation at a steady rate, however when placing a weighted pill consisting of Glydrill DW mud the seepage stopped. Glydrill DW has the capability to form filtercake

Subject:	Make-up of 20" 133 ppf N80 Tenaris ER connections with OCR325AG		
Section:	NO 6302/6-1, 26"		
Rep date:	31.10.2005		
Keywords:	CASING/LINER		
Comp inv:	Weatherford Norge AS		
Synergi no:	325338	**Cost:**	901000

Description:
Synergi 325338 (Closed) - 01.06.2005 - Other non-conformities - 20" casing threads make-up problems
While running 20" 133ppf, N-80 casing with Tenaris ER (Antares) threads, problems were experienced making the string up according to specified parameters.

The 20" string is run with JAM, illustrating the torque-turn pattern, and on several connections excess torque build-up was seen prior to shoulder torque indications.

In total 7 joints were laid out during the job, after cross-threading or damaging threads in the process of making the string up. Alignment was checked and string redoped along the way to improve conditions without success. Both pin and box ends were observed with abnormalities (reference is made to separate reports from Weatherford).

Specified MU values (not friction factor corrected) for the string is 18130/19600/21070 ft-Ibs for minimum/optimum/maximum respectively. The string was run with OCR 325 AG casing dope.

Maximum MU torques was up to 32 kft-Ibs.

The entire string was inspected in Kristiansund prior to shipment to the rig.

Immediate solution:
Increased MU torque after discussions between Weatherford and Tenaris. Ref attached document !

Field Make up (w/OCR325 AG)
Optimum MU torque: 44000 ft-lbs
Minimum MU torque: 42000 ft-lbs
Maximum MU torque: 45000 ft-lbs

Future recommended solution:
Casing must be properly inspected for tolerances, pin/box, and all rag on threads must be removed.

Evaluate hiring casing contractor to take responsibility over the casing inspection onshore.

Subject:	SWF detection and handling
Section:	NO 6302/6-1, 26"

Rep date: 17.11.2005
Keywords: DRILLING

Description:
First sign of the SWF was increasing ECD. This was not reported to Statoil Supervisor even though data operator was aware of it.

Immediate solution:
Stopped drilling and observed well with the ROV. Confirmed well flowing.
Future recommended solution:
* Establish early detection methods during riser less drilling. Close monitoring of the ECD. Set alarms on the ECD.
* Use high resolution MWD with near bit GR sensor.
* Flow check well after every sand that is penetrated.
* Plug cement flowing sand zone and run casing above it?
* Evaluate pilot hole as a better mean to detect flowing sand zones. Cementing through bit inside pilot hole ?
* Flow rates prone to washing out of the ball seats in the wiper plug seem to be conservative, with muds with low sand content.
* Minimum 2 times the hole volume with kill mud is necessary when killing SWF. Pumped at a flow rate as high as possible.
Establish criteria/decision tree for which pressures that can be handled and which that cannot (E.g. 1,20 sg EMW OK and 1,21 sg EMW not OK ?)

Subject: Mitigation of foaming problems with the Glydrill DW mud.
Section: NO 6302/6-1, 17"X20"
Rep date: 19.10.2005
Keywords: DRILLING FLUID

Description:
Experienced loss in pump pressure due to air trapped in the mud system. Additions of Defoam NS helped, but using Halliburton`s NF6 did have a better effect. After approximately 12 hrs drilling the problems ceased.

The foaming could be a result of the mud system being new, with no solids. This tend to increase possibility for foaming or air entrapment.
Immediate solution:
Added Halliburtion's NF-6 de-foaming agent, reduced foaming sufficiently. Troubleshot flow line system in case air was leaking in somewhere. No air leak.
Future recommended solution:
Reduce air in the mud/foaming by running the degasser while drilling out cement so that the mud system will not be aerated when starting to drill the new section.
MI was not prepared for the foam issues and should be followed up regarding how to avoid this problem next time same mud system is being used.

Subject: Not optimum to drill out 20" shoe track with 17" bit
Section: NO 6302/6-1, 17"X20"
Rep date: 19.10.2005
Keywords: DRILLING

Description:
Not optimum to drill out 20" shoe track with 17" bit since the couplings on the 16" liner are listed to be 17,063". A larger OD bit could not be used due to the stop ring installed inside the 20" casing.
Opened up to 20" hole below the 20" casing shoe, but not inside the casing.

Excess amount of cement inside the 20" casing due to squeeze cementing.
Immediate solution:
The connections were measured to less than 17" on the rig.

Future recommended solution:
Evaluate whether the combination stop ring in the 20" casing together with a 16" liner with 17" couplings can be avoided.

Subject:	Underreaming 17" x 20" hole
Section:	NO 6302/6-1, 17"X20"
Rep date:	17.11.2005
Keywords:	HOLE OPENING/UNDERREAMING

Description:
When POOH with the UR after drilling 17"x20", unable to retrieve the UR.
Immediate solution:
Had to back-ream out of hole.

Due to concerns regarding hole inclination, decided to drill and open up 17" x 20" section in two runs.
Future recommended solution:
* Evaluate to drill and open up to 20" hole in one run.
* Evaluate the hole quality when using UR inside casing.

Subject:	Unable to land 16" liner at correct place
Section:	NO 6302/6-1, 17"X20"
Rep date:	17.11.2005
Keywords:	CASING/LINER

Description:
Landed the liner hanger on the no-go. Lost circulation, lifted the liner off the no-go to establish circulation. Unable to land the liner hanger back onto the no-go after cementing.

Future recommended solution:
Dril Quip liner hanger system is volnurable.
Pipe stretch may have caused confusion when landing the hanger.
Evaluate concept seal assembly sealing against a short sealing area. Increase seal area length ?

Communicate operational issues around running the 16" liner hanger in the DOP.

Subject:	Casing contractor should supply automatic dog collars
Section:	NO 6302/6-1, 17 1/2"
Rep date:	19.10.2005
Keywords:	CASING/LINER

Description:
For this operation only manual dog collars were supplied.
Immediate solution:

Future recommended solution:
Automatic dog collar must be supplied by casing contractor.

Subject:	Stretch calculations should have been performed upfront running the 13 3/8" casing
Section:	NO 6302/6-1, 17 1/2"
Rep date:	19.10.2005
Keywords:	CASING/LINER
Downtime:	3,50
Comp inv:	Statoil
Synergi no:	331412 **Cost:** 371000

Description:
Synergi 331412 (Closed) - 05.08.2005 - Other non-conformities - Space-out problems during landing of 13 3/8" casing

When landing 13 3/8" casing, it was believed the hanger was not landed due to landing string stretch not being accounted for in space-out calculations. Reference is made to attached file for further explanations of the background and incident.

Immediate solution:
To prove the hanger was in fact landing in the correct position, the string was pulled up under the LPR and the hanger running tool up under the LAP. When landing off and slacking off all the casing weight the stretch was taken out of the landing string and this proved to be approx 1.8m corresponding to the deviation experienced between actual and planned landing depth. Correct landing was now confirmed by the index-line mark and measurement.

Stretch calculations performed after the operation shows theoretical stretch in the landing string as a result of 150 MT casing weight hanging in the end results in a 1.6m elongation. In addition there will be an effect of the 50 mt landing string weigth.

Future recommended solution:
Prognosed stretch calculations must be included in detailed procedures for future casing operations in deep water with long landing string and heavy casing. Landing string elongation will be considerable

Subject: Order a double wing Weco 1502 to enable pumping through the cement hose using both cement unit and rig pumps
Section: NO 6302/6-1, 17 1/2"
Rep date: 19.10.2005
Keywords: CEMENTING

Description:
A double wing Weco 1502 must be ordered to enable pumping through the cement hose with both the cement and rig pumps and avoid having to switch back and forth from pumping through cement hose and top drive.

Immediate solution:

Future recommended solution:
With the possibility to pump through cement hose with both rig and cement pump, a TIW should be supplied above the cement head to reduce wear and tear on the manual and remote valves in the TD. Loosing rig-time due to change-out of these as a result of wash-out at low pressures are a known problem. With a TIW above the cement head, closed when taking in the cement head the TD is isolated throughout the job.

Subject: Heavy duty landing string should be delivered with pup joints to aid space-out consideration
Section: NO 6302/6-1, 17 1/2"
Rep date: 19.10.2005
Keywords: CASING/LINER

Description:
When sourcing separate landing strings for the purpose of landing heavy casings, a few pup joints should also be supplied to aid space-out considerations.

Future recommended solution:
Make sure that pup joints are also supplied when ordering landing string.

Subject: Pressure and temperature effects not taken into account during hydraulics modelling
Section: NO 6302/6-1, 17 1/2"
Rep date: 02.11.2005
Keywords: DRILLING FLUID
Comp inv: Statoil

Description:
Temperature and pressure has a significant effect on the drilling fluid rheology. As a result, the drilling fluid parameters can be different in various sections in the well and this affects the dynamic pressures in the well.

As a result, designing factors such as the ECD was under estimated in the planning phase of the well.

In addition, the mud temperature effects can cause a pressure increase after the well has been shut in.

Future recommended solution:
Use different type of engineering software where these effects are being accounted for.

Subject:	PWD data on LOT/FIT
Section:	NO 6302/6-1, 12 1/4"
Rep date:	25.11.2005
Keywords:	MWD/LWD

Description:
PWD data from the memory log is diviating from the intepreted LOT/FIT data.

Future recommended solution:
In cases where the PWD data from the memory log is different from the interpretated LOT/FIT data, the intepreted LOT/FIT data should be governing and the PWD data should be used as a reference.

Subject:	Cementing 9 5/8" liner with rotation
Section:	NO 6302/6-1, 12 1/4"
Rep date:	25.11.2005
Keywords:	CEMENTING
Comp inv:	Halliburton

Description:
Losses were experienced when start rotating the 9 5/8" liner. The hydraulic effects of rotating the liner during cementing was not taken into account in the recommended cementing procedure.

Future recommended solution:
The hydraulic effect of rotating the liner should be included in the ECD calculation.
Evaluate to cut back on the displacement rate when using rotating liner hangers.

Subject:	Mud weight measurement
Section:	NO 6302/6-1, 8 1/2"
Rep date:	25.11.2005
Keywords:	DRILLING FLUID
Comp inv:	M-I Drilling Fluids

Description:
The mud weight scale should be calibrated with brine rather than freshwater when using drilling fluids with a mud weight around 1,40 sg - 1,50 sg.
If not, the measured mud weight may be wrong.

Future recommended solution:
Calibrate mud weight scale using brine rather than freshwater.

Address this during the detailed planning phase

Subject:	Drilling practice on drill break
Section:	NO 6302/6-1, 8 1/2"
Rep date:	25.11.2005
Keywords:	DRILLING

Description:
Potentially, after a drill break, making a 5 stand short trip directly after may induce swabbing a large volume. Swabbing can still take place on connection (rig heave) when pumping out of hole.

Future recommended solution:
On a drill break, evaluate performing a 10-10-10 test first and circulate BU through choke line. If necessary, adjust mud weight and then perform a 5 stand short trip.

Subject:	Glydrill DW effect on OH conditions
Section:	NO 6302/6-1, 8 1/2"
Rep date:	25.11.2005
Keywords:	DRILLING FLUID
Comp inv:	M-I Drilling Fluids

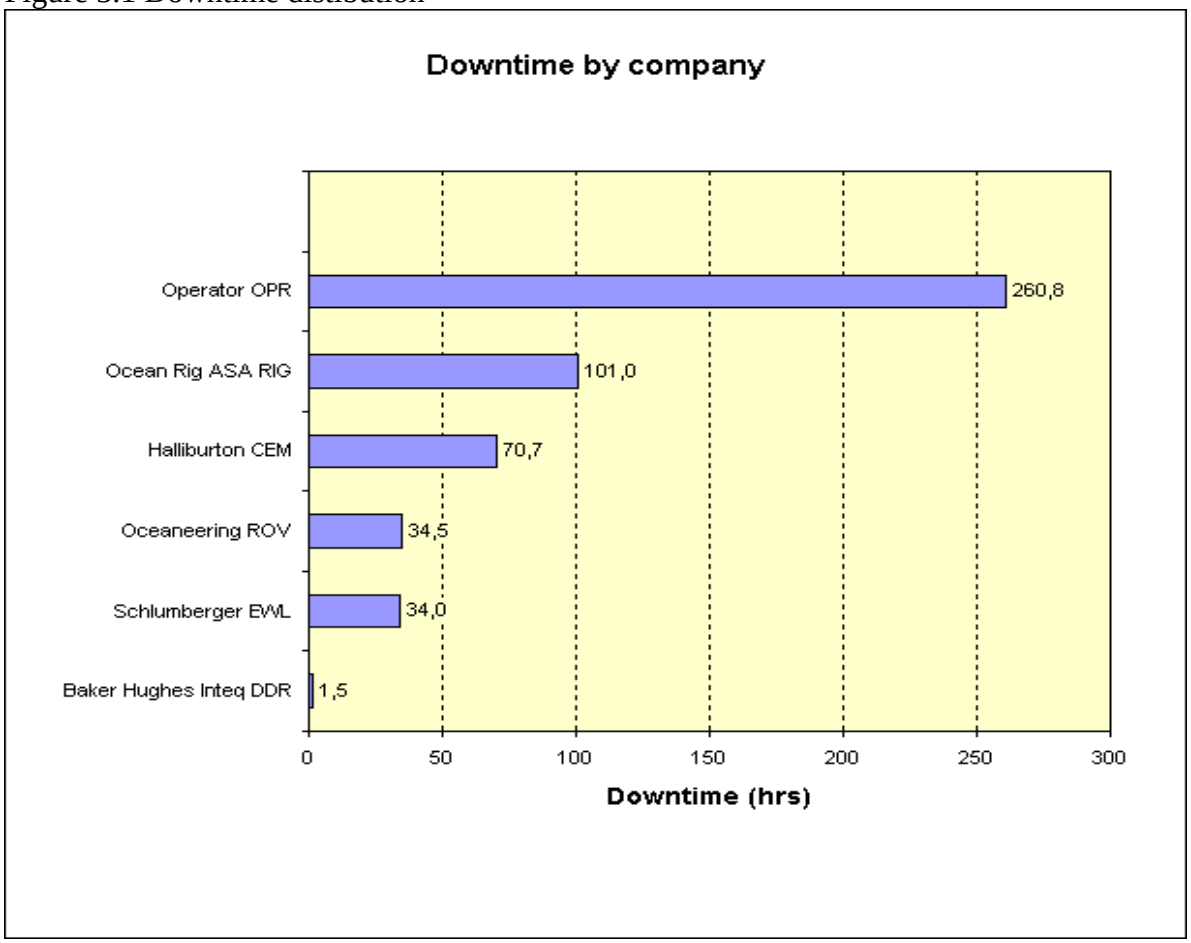
Description:
After drilling 8 1/2" section to TD the hole was left open for over 7 days during the extended logging programme. No hole instability issues were experienced and no wiper trip was required.

Subject:	Volume required to fill surface lines
Section:	NO 6302/6-1, PERM P&A
Rep date:	21.10.2005
Keywords:	CIRCULATION LOSS

Description:
Surface equipment lines takes 6 m3 to fill when circulating through kill/choke lines and poor boy degasser.
Wrong read-out on shaker pits make picture somewhat difficult to interpret.

3.3 Incidents by service and company

Figure 3.1 Downtime distibution



SERVICE COMPANY: Cementing CEM Halliburton
WELLBORE: NO 6302/6-1

Incident start time	Failure code	Synergi no	Title	Quality cost		Downtime		
				NOK	NOK/d	Total hrs	Comp share %	Comp share hrs
26.06.2005 00:00:00	CEM-10 Cement procedure	327796	Cement grouting in 36"x42" annulus aborted due to mixing problems.	2491000	2544000	23.5	100	23.5

WELLBORE: NO 6302/6-U-1

Incident start time	Failure code	Synergi no	Title	Quality cost		Downtime		
				NOK	NOK/d	Total hrs	Comp share %	Comp share hrs
12.06.2005 21:30:00	CEM-E01 Equipment functions	322765	Leakage on nitrogen manifold systems	265000	2544000	2.5	100	2.5
13.06.2005 00:30:00	CEM-E01 Equipment functions	322119	Aborted 20" cementing operation due to equipment blockage and/or leakage.	3922000	2544000	37.0	100	37.0
15.06.2005 01:00:00	CEM-08 Cementer support	349482	Aborted cementing operation due to blocked cement inside surge tank.	4399000	2544000	41.5	10	4.2
18.06.2005 01:30:00	CEM-11 Procedure not followed	322412	Unable to regulate throttle on cement unit	1219000	8358857	3.5	100	3.5
			Total	12296000				70.7

SERVICE COMPANY: Directional Drilling DDR Baker Hughes Inteq
WELLBORE: NO 6302/6-1

Incident start time	Failure code	Synergi no	Title	Quality cost		Downtime		
				NOK	NOK/d	Total hrs	Comp share %	Comp share hrs
13.07.2005 11:00:00	DDR-E23 MWD/LWD *	327583	Negative to down load MWD tool	159000	2544000	1.5	100	1.5
			Total	159000				1.5

SERVICE COMPANY: Electric Wireline Logging EWL Schlumberger
WELLBORE: NO 6302/6-1

Incident start time	Failure code	Synergi no	Title	Quality cost		Downtime		
				NOK	NOK/d	Total hrs	Comp share %	Comp share hrs
18.08.2005 23:00:00	EWL-E04 Cables/Heads & Assoc..	333959	Trouble shot logging tool.	397500	2385000	4.0	100	4.,0
16.09.2005 06:00:00	EWL-E03 Acquisition/ Computers	343718	Computer problems and lost communication with tool in logging run #1 and 2.	185500	2968000	1.5	100	1.5

Incident start time	Failure code	Synergi no	Title	Quality cost		Downtime		
				NOK	NOK/d	Total hrs	Comp share %	Comp share hrs
17.09.2005 06:00:00	EWL-E03 Acquisition/ Computers	340138	Computer crash	106000	2544000	1.0	100	1.0
18.09.2005 00:00:00	EWL-E02 Auxiliary mechanical	339663	Problem to start a generator for the MSCT tool	477000	2544000	4.5	100	4.5
18.09.2005 08:00:00	EWL-E05 Downhole electronic	340300	Hydraulic oil failure alarm	477000	2544000	4.5	100	4.5
20.09.2005 08:00:00	EWL-E05 Downhole electronic	340680	Telemetry problems	636000	2544000	6.0	100	6.0
20.09.2005 17:00:00	EWL-E03 Acquisition/ Computers	340682	Electrical fault in WSAM module 911	53000	2544000	0.5	100	0.5
21.09.2005 06:00:00	EWL-E05 Downhole electronic	340908	Bad insulation on electric wireline	1272000	2544000	12.0	100	12.0
			Total	3604000				34.0

SERVICE COMPANY: Operator OPR Operator
WELLBORE: NO 6302/6-1

Incident start time	Failure code	Synergi no	Title	Quality cost		Downtime		
				NOK	NOK/d	Total hrs	Comp share %	Comp share hrs
30.06.2005 09:00:00	CAS-E02 Torque/turn monit., eval.&rec. device	325338	20" casing threads make-up problems	901000	2544000	8.5	100	8.5
07.07.2005 14:30:00	CEM-10 Cement procedure	327121	Cement squeeze 20" shoe due to unacceptible LOT	5088000	2544000	48.0	100	48.0
20.07.2005 22:00:00	DRF-20 Other failures	350040	16" liner lap squeeze	6307000	2544000	59.5	100	59.5
03.08.2005 20:00:00	RIG-03 Procedure not followed	331184	Unable to break over-torqued saver sub on top-drive.	318000	2544000	3.0	100	3.0
05.08.2005 18:30:00	RIG-03 Procedure not followed	331412	Space-out problems during landing of 13 3/8" casing	371000	2544000	3.5	100	3.5
08.08.2005 17:30:00	CEM-20 Other failures	341278	Cement squeeze 13 3/8" casing shoe due to unacceptible LOT	5618000	2544000	53.0	100	53.0
22.08.2005 14:00:00	DRF-20 Other failures	335189	Re-tested BOP's to 360 bar/1,40 SG mud	1749000	2544000	16.5	100	16.5
27.08.2005 08:30:00	DDR-01 Procedure	335549	Swabbed HC into wellbore while tripping out.	1219000	2544000	11.5	100	11.5
08.09.2005 12:00:00	RIG-02 Doc./Spec.	338108	Separate run for testing the lower pipe ram (LPR)	583000	2544000	5.5	100	5.5

Incident start time	Failure code	Synergi no	Title	Quality cost		Downtime		
				NOK	NOK/d	Total hrs	Comp share %	Comp share hrs
10.09.2005 01:30:00	DDR-08 Other	349971	Mud pressure and temperature effects in the well	901000	2544000	8.5	100	8.5

WELLBORE: NO 6302/6-U-1

Incident start time	Failure code	Synergi no	Title	Quality cost		Downtime		
				NOK	NOK/d	Total hrs	Comp share %	Comp share hrs
02.06.2005 17:00:00	RIG-E30 Other Equipment	322117	Problems transfering bulk cement (tuned light) from cement silos to cement unit	1219000	2544000	11.5	52	6.0
15.06.2005 01:00:00	CEM-08 Cementer support	349482	Aborted cementing operation due to blocked cement inside surge tank.	4399000	2544000	41.5	90	37.4
			Total	28673000				260.8

SERVICE COMPANY: ROV Systems ROV Oceaneering
WELLBORE: NO 6302/6-U-1

Incident start time	Failure code	Synergi no	Title	Quality cost		Downtime		
				NOK	NOK/d	Total hrs	Comp share %	Comp share hrs
29.05.2005 17:00:00	ROV-E16 Electronics	318724	ROV not properly set up for deep water DP operations	2862000	2544000	27.0	100	27.0
06.06.2005 06:00:00	ROV-E13 Control system	322114	Operational delay due to ROV hydraulic oil leak	795000	2544000	7.5	100	7.5
			Total	3657000				34.5

SERVICE COMPANY: Rig Operations RIG Ocean Rig ASA
WELLBORE: NO 6302/6-1

Incident start time	Failure code	Synergi no	Title	Quality cost		Downtime		
				NOK	NOK/d	Total hrs	Comp share %	Comp share hrs

Incident start time	Failure code	Synergi no	Title	Quality cost		Downtime		
				NOK	NOK/d	Total hrs	Comp share %	Comp share hrs
01.07.2005 19:30:00	RIG-E30 Other Equipment	325543	Electrical problem with valve for cement bulk tank C.	106000	2544000	1.0	100	1.0
03.07.2005 11:00:00	RIG-E20 Riser system	326445	Riser skid malfunctioning	477000	2544000	4.5	100	4.5
04.07.2005 06:00:00	RIG-E20 Riser system	326446	Leakage in choke stab on slip joint	318000	2544000	3.0	100	3.0
05.07.2005 09:30:00	RIG-E07 Top drive	341521	Failed pressure test on top drive kelly cock.	212000	2544000	2.0	100	2.0
05.07.2005 14:00:00	RIG-E05 Pipe handling	341525	Malfunctioning encoding system on Hydraracker.	795000	2544000	7.5	100	7.5
07.07.2005 04:00:00	RIG-E03 BOP stack/valves	326938	Leakage in choke manifold	318000	2544000	3.0	100	3.0
07.07.2005 19:00:00	RIG-E08 Hydraulic power system	326942	Malfunction on HYDRARACKER	265000	2544000	2.5	100	2.5
08.07.2005 09:00:00	RIG-E05 Pipe handling	326946	Malfunction on HYDRARACKER	212000	2544000	2.0	100	2.0
08.07.2005 12:00:00	RIG-E05 Pipe handling	326952	Leak air hose on auto slips	53000	2544000	0.5	100	0.5
08.07.2005 16:00:00	RIG-E05 Pipe handling	326957	Hydraulic leakage on remote operated back-up racking arm	159000	2544000	1.5	100	1.5
13.07.2005 18:00:00	RIG-E08 Hydraulic power system	327584	Damaged hydraulic hose on pipe handling equipment.	159000	2544000	1.5	100	1.5
22.07.2005 06:00:00	RIG-E05 Pipe handling	329245	Hydraulic leak in auto elevator	53000	2544000	0.5	100	0.5
23.07.2005 10:00:00	RIG-E05 Pipe handling	329276	Re-calibrated Hydra racker	56000	2688000	0.5	100	0.5
23.07.2005 20:00:00	RIG-E05 Pipe handling	329279	Fault on Hydra racker	106000	2544000	1.0	100	1.0
29.07.2005 09:00:00	RIG-E07 Top drive	330176	Damaged Top Drive.	212000	2544000	2.0	100	2.0
05.08.2005 00:00:00	RIG-E06 Deck crane	331377	Damaged hydraulic hoses on forward knuckle boom crane.	53000	2544000	0.5	100	0.5
05.08.2005 02:00:00	RIG-E10 Drawwork	331374	Respooled slack drill-line.	106000	2544000	1.0	100	1.0
06.08.2005 09:00:00	RIG-E30 Other Equipment	332865	Repaired pipe skate chain.	53000	2544000	0.5	100	0.5
07.08.2005 16:00:00	RIG-03 Procedure not followed	331821	Stand fell out and leaned against a beam in the derrick.	53000	2544000	0.5	100	0.5

Incident start time	Failure code	Synergi no	Title	Quality cost		Downtime		
				NOK	NOK/d	Total hrs	Comp share %	Comp share hrs
08.08.2005 06:00:00	RIG-E19 Drill pipe	331820	Bent a single of drill pipe in the effort to recapture the stand of pipe that was loose in the derrick.	53000	2544000	0.5	100	0.5
13.08.2005 08:30:00	RIG-03 Procedure not followed	332861	Pumped lighter mud into active system by mistake.	106000	2544000	1.0	100	1.0
14.08.2005 00:00:00	RIG-E14 Mud pumps	332862	Stop in operation due to replacement off pop offs.	106000	2544000	1.0	100	1.0
14.08.2005 06:00:00	RIG-E05 Pipe handling	332906	Broken hydraulic fittings on BX elevator while making a connection.	106000	2544000	1.0	100	1.0
15.08.2005 10:00:00	RIG-E05 Pipe handling	333286	Stuck slips in rotary table	106000	2544000	1.0	100	1.0
18.08.2005 21:00:00	RIG-E388 General	333939	Pressurization of wire line unit.	106000	2544000	1.0	100	1.0
21.08.2005 07:30:00	RIG-E05 Pipe handling	336891	Hydraulic leakage on service loop hose reel	106000	2544000	1.0	100	1.0
23.08.2005 22:00:00	RIG-E05 Pipe handling	335192	Damaged lock ring on torque wrench guide.	159000	2544000	1.5	100	1.5
25.08.2005 00:00:00	RIG-E03 BOP stack/valves	335208	Damaged gate in choke manifold valve.	1325000	2544000	12.5	100	12.5
25.08.2005 14:30:00	RIG-E07 Top drive	335210	Leakage on wash pipe	212000	2544000	2.0	100	2.0
03.09.2005 06:00:00	RIG-E05 Pipe handling	337499	Hydraracker electrical fault.	636000	2544000	6.0	100	6.0
04.09.2005 07:00:00	RIG-E30 Other Equipment	341284	Recalibrated crown mounted compensator	106000	2544000	1.0	100	1.0
05.09.2005 20:30:00	RIG-E05 Pipe handling	341841	Broken hydraulic hose on Hydraracker	53000	2544000	0.5	100	0.5
09.09.2005 01:30:00	RIG-E07 Top drive	338187	Top drive upper IBOP failed pressure test.	530000	2544000	5.0	100	5.0
13.09.2005 00:00:00	RIG-E07 Top drive	338639	Unable to break out top drive saver sub for connection	159000	2544000	1.5	100	1.5
15.09.2005 06:00:00	RIG-03 Procedure not followed	339290	Stand of Drill Pipe Fell out of the finger board.	56000	2688000	0.5	100	0.5
23.09.2005 06:00:00	RIG-E05 Pipe handling	341217	Hydraulic leakage in DP elevator.	53000	2544000	0.5	100	0.5
23.09.2005 22:30:00	RIG-E03 BOP stack/valves	341212	Lo Torque Valve failed pressure test.	371000	2544000	3.5	100	3.5
26.09.2005 18:00:00	RIG-E04 Iron roughneck	341867	Iron Roughneck failure	371000	2544000	3.5	100	3.5

Incident start time	Failure code	Synergi no	Title	Quality cost		Downtime		
				NOK	NOK/d	Total hrs	Comp share %	Comp share hrs
26.09.2005 22:30:00	RIG-E30 Other Equipment	343444	Chain in moonpool securing mouse hole broke.	159000	2544000	1.5	100	1.5
29.09.2005 17:00:00	RIG-03 Procedure not followed	342621	Seawater accidentally pumped into trip tank	159000	2544000	1.5	100	1.5
02.10.2005 13:00:00	RIG-E02 BOP control system	343038	Lost pressure on accumulator bottles to LMRP.	268000	2572800	2.5	100	2.5

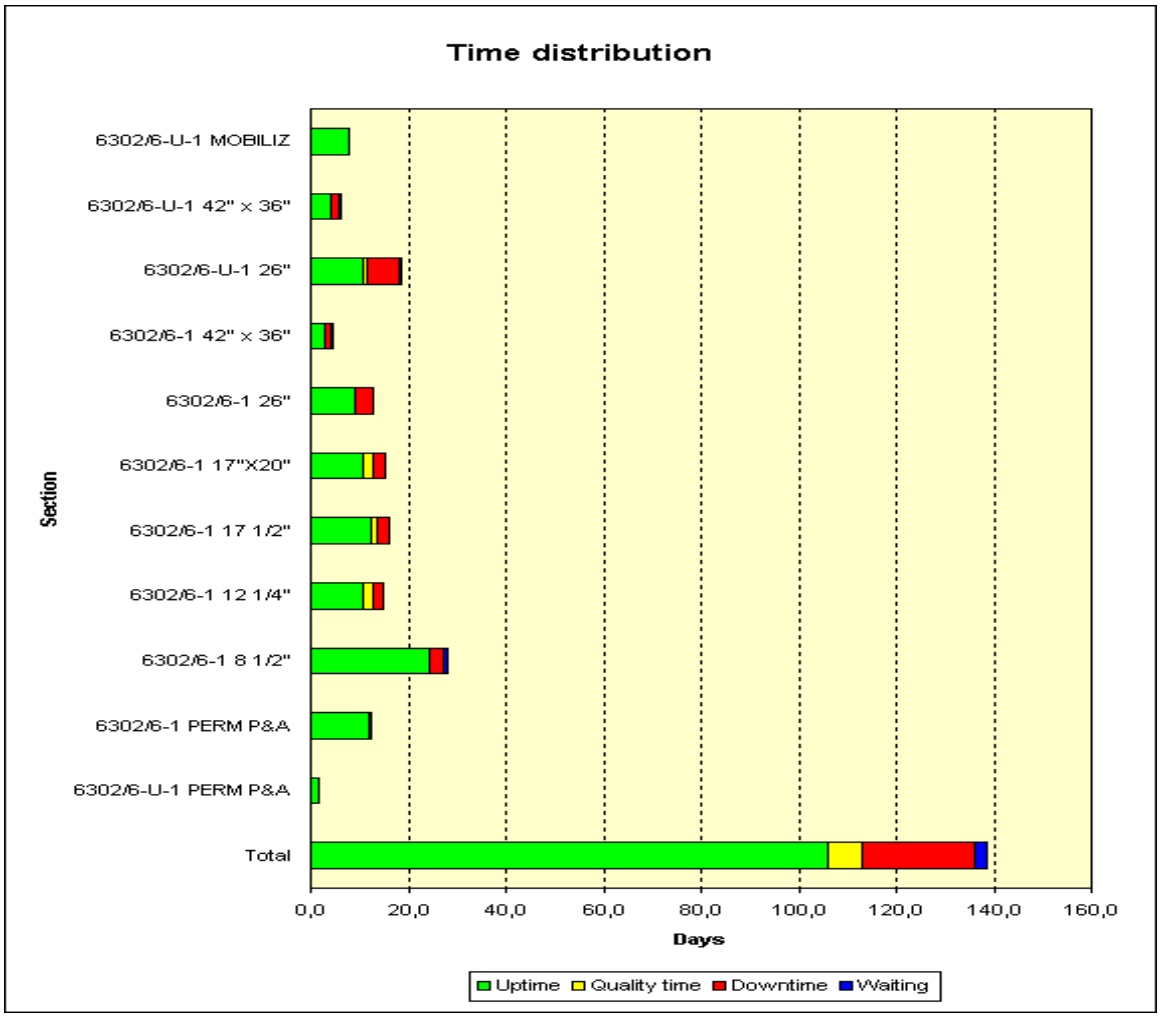
WELLBORE: NO 6302/6-U-1

Incident start time	Failure code	Synergi no	Title	Quality cost		Downtime		
				NOK	NOK/d	Total hrs	Comp share %	Comp share hrs
02.06.2005 17:00:00	RIG-E30 Other Equipment	322117	Problems transfering bulk cement (tuned light) from cement silos to cement unit	1219000	2544000	11.5	48	5.5
04.06.2005 00:30:00	RIG-E04 Iron roughneck	350445	Broken bolt on iron roughneck	53000	2544000	0.5	100	0.5
18.06.2005 06:00:00	RIG-E02 BOP control system	322769	Unable to test BOP conduit line.	848000	2544000	8.0	100	8.0
22.06.2005 06:00:00	RIG-E05 Pipe handling	343619	Trouble shot and rebooted V-ICIS system	265000	12720000	0.5	100	0.5
22.06.2005 10:00:00	RIG-E02 BOP control system	343620	Rupture in MUX outer casing	53000	2544000	0.5	100	0.5
22.06.2005 16:00:00	RIG-E20 Riser system	343621	Fractured line on riser handling tool	53000	2544000	0.5	100	0.5
			Total	11563000				101.0

3.4 Time distribution

Section	Start time	Length m	Budget hrs	Budget days	TL hrs	TL days	Actual hrs	Actual days	Ops (f)
NO 6302/6-U-1 MOBILIZ	21.05.2005 17:00	0.0	224.8	9.4	162.0	6.8	191.5	8.0	100.0
NO 6302/6-U-1 42" x 36"	29.05.2005 16:30	82.0	23.4	1.0	0.0	0.0	152.0	6.3	74.3
NO 6302/6-U-1 26"	05.06.2005 00:30	756.0	0.0	0.0	0.0	0.0	446.0	18.6	65.6
NO 6302/6-1 42" x 36"	23.06.2005 14:30	81.0	128.7	5.4	75.2	3.1	107.5	4.5	78.1
NO 6302/6-1 26"	28.06.2005 02:00	601.5	256.1	10.7	149.7	6.2	302.5	12.6	72.2
NO 6302/6-1 17"X20"	10.07.2005 16:30	422.0	108.2	4.5	0.0	0.0	366.5	15.3	82.4
NO 6302/6-1 17 1/2"	25.07.2005 23:00	662.0	282.0	11.8	154.2	6.4	389.0	16.2	83.4
NO 6302/6-1 12 1/4"	11.08.2005 05:00	793.0	277.9	11.6	123.4	5.1	353.0	14.7	87.7
NO 6302/6-1 8 1/2"	25.08.2005 22:00	385.0	278.4	11.6	156.9	6.5	677.0	28.2	89.4
NO 6302/6-1 PERM P&A	23.09.2005 03:00	0.0	250.2	10.4	183.0	7.6	301.5	12.6	95.6
NO 6302/6-U-1 PERM P&A	03.10.2005 22:00	0.0					37.5	1.6	100.0
Sum			1829.7	76.4	1004.4	41.7	3324.0	138.6	

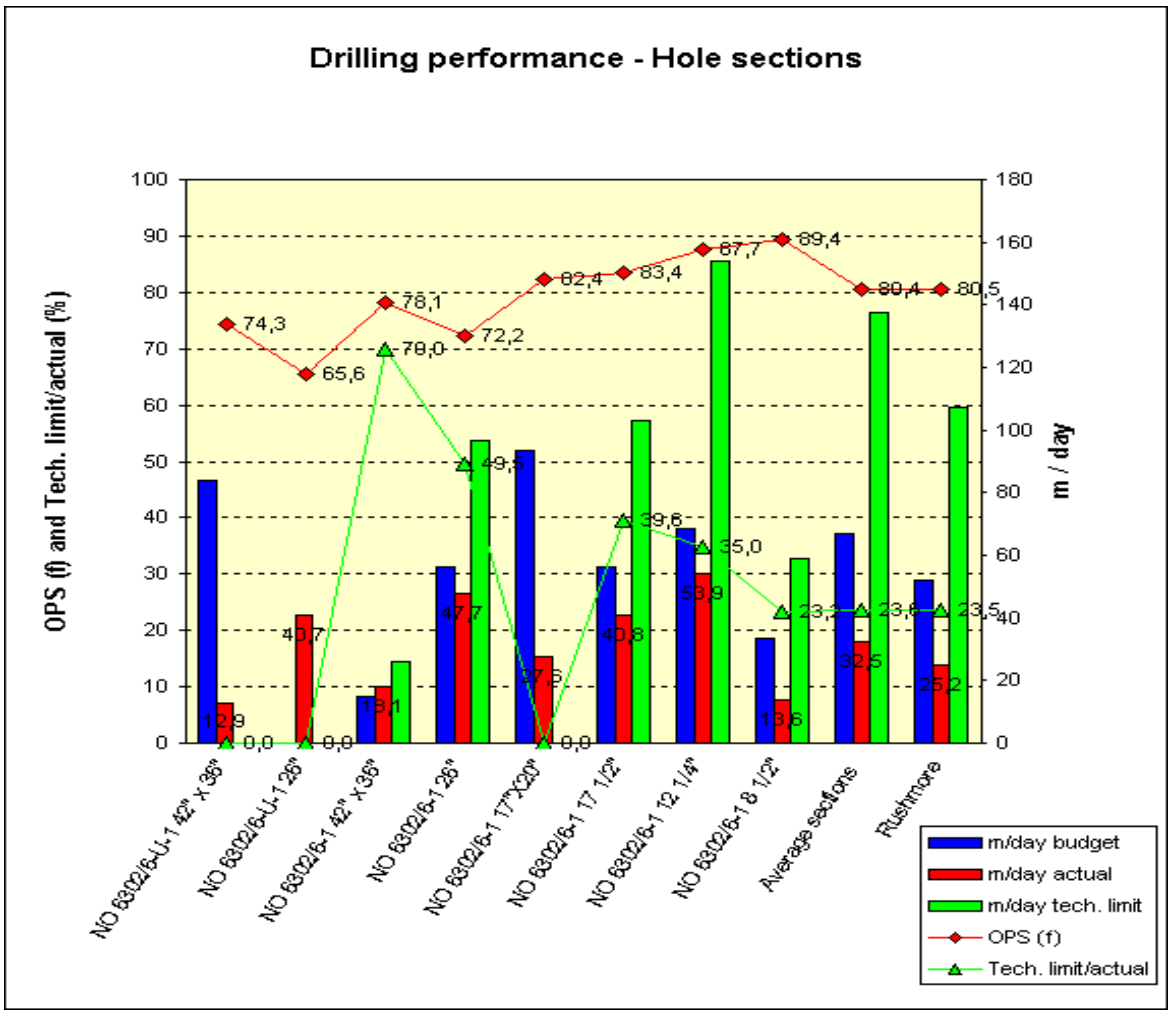
Figure 3.2 Time distritution



The graph on the previous page is based on the following details:

Section	Downtime	Uptime	Quality time	Waiting time	Total time
6302/6-U-1 MOBILIZ	0.0	8.0	0.0	0.0	8.0
6302/6-U-1 42" x 36"	1.6	4.2	0.0	0.5	6.3
6302/6-U-1 26"	6.4	10.6	1.2	0.5	18.6
6302/6-1 42" x 36"	1.0	3.0	0.0	0.5	4.5
6302/6-1 26"	3.5	9.1	0.0	0.0	12.6
6302/6-1 17"X20"	2.7	10.8	1.8	0.0	15.3
6302/6-1 17 1/2"	2.7	12.2	1.3	0.0	16.2
6302/6-1 12 1/4"	1.8	10.5	2.4	0.0	14.7
6302/6-1 8 1/2"	2.9	24.2	0.3	0.8	28.2
6302/6-1 PERM P&A	0.5	11.8	0.0	0.2	12.6
6302/6-U-1 PERM P&A	0.0	1.6	0.0	0.0	1.6
Total	23.1	106.0	6.9	2.5	138.5

Figure 3.3 Drilling performance



3.5 Cost

Budget cost: 267.783 MNOK

Actual cost: 425 MNOK

4 Geology and formation evaluation report

4.1 Geological setting

Block 6302/6 is situated in deep water in the western part of the Møre Basin, Norwegian Sea. At the well location the Quaternary North Sea Fan is very thick. No other wells have penetrated such thicknesses of North Sea Fan sediments.

The Tulipan Prospect of Danian (Paleocene) age is a four-way closure, with a seismic anomaly, which was probably formed by magma-tectonic activity during the continental break-up in the late Palaeocene to earliest Eocene time. The reservoir model assumed a westerly sourced sandy turbidite system.

Possible additional sandstones could be present in the Tare, Tang and Springar Formations.

This frontier well was the first well to penetrate the thick North Sea Fan.

4.2 Shallow gas results

No shallow gas was predicted anywhere within the site survey area for the well. The well was therefore classified as Shallow Gas Class 0.

No shallow gas was observed. A water flow was however observed at 2114 m (in the North Sea Fan) in the well 6302/6-U-1, related to a rapid pore pressure increase.

The standard NPD shallow gas form is presented in appendix E.

4.3 Stratigraphy

The stratigraphical zonation is based on interpretation of the biostratigraphic report, log curves and on correlation with nearby wells. The stratigraphy of the entire well is shown in Table 4.2 and in the Figure 4.4.

4.3.1 Table of chronostratigraphy

Table 4.1 Chronostratigraphy

Stratigraphic succession		**Interval (m MD) (drillers depth)**	
Studied interval 1980 – 4236 m		**From**	**To**
Tertiary	Late Pliocene	1980	2400
	Early Pliocene	2420	2460
	Base Pliocene	2480	2480
	Late Miocene	2480	2540
	Middle Miocene	2560	2580
	Early Miocene	2600	2680
	Late Oligocene	2700	2880
	Early Oligocene	2900	3060
	Late Eocene	3070	3076
	---------- Late Eocene UNC ----------		
	Middle Eocene	3080	3150
	Early Eocene	3160	3340
	Late Paleocene	3350	3680
	Early Paleocene	3690	4089
---------- Base Tertiary UNC ----------			
Cretaceous	Late Maastrichtian	4098	4158
	Early Maastrichtian	4158	4230

4.3.2 Table of lithostratigraphy

Table 4.2 Lithostratigraphy

Table of lithostratigraphy					
Period	**Group / Formation**	**Observed depth**			TWT sec.
		m MD	**m TVD**	**m MSL**	(From VSP)
QUATERNARY	NORDLAND GROUP (Sea Floor)	1285.5	1285.5	1260.5	1.719
	Naust Formation	1285.5	1285.5	1260.5	1.719
TERTIARY	Base Quaternary	2393	2393	2368	2.858
	Kai Formation	2463	2463	2438	2.913
	Top Ooze	2520	2520	2495	
	HORDALAND GROUP	2582	2582	2557	3.035
	Brygge Formation	2582	2582	2557	3.035
	Opal A/CT	2774	2774	2749	3.238
	Base Ooze	2978	2978	2953	3.448
	ROGALAND GROUP	3223	3223	3198	3.696
	Tare Formation (TEo MFS 170)	3223	3223	3198	3.696
	TEo MFS 165	3231	3231	3206	3.704
	Intra Tare Fm. (TEo MFS 155)	3313	3313	3288	3.772
	TPa MFS 140	3335	3335	3310	3.793
	Tang Formation (TPa MFS 115)	3395	3395	3370	3.845
	TPa MFS 90	3548	3548	3523	3.970
	Tang Fm / Seland (TPa MFS 80)	3597	3597	3572	4.015
	TPa MFS 60 (Danian)	3763	3763	3738	4.162
	Danian Sandstone	3901	3901	3876	4.277
	SHETLAND GROUP	4080	4080	4055	4.408
	Springar Formation	4080	4080	4055	4.408
	TMa MFS 129	4099	4099	4074	4.416
	TMa MFS 125	4150	4150	4125	4.449
CRETACEOUS	TD	4234	4234	4209	-

4.4 Lithostratigraphic description

The description of the lithology is based on the cuttings-, sidewall core-, and core descriptions. See enclosures. Also, a list of the ROV samples taken in the top hole are enclosed (well 6302/6-U-1).

NORDLAND GROUP **1285.5 – 2582 m MD (1260.5 – 2557 m TVD MSL)**

The Nordland Group comprises the Naust and the Kai Formations.

Naust Formation **1285.5 – 2463 m MD (1260.5 – 2438 m TVD MSL)**

System: Tertiary - Quaternary
Series: Pliocene - Pleistocene
Depositional environment: Marine shelfal - bathyal

Quaternary represent the major part of the Naust Formation at the Tulipan location. Even though cuttings indicates Pliocene age of the sediment samples from 1980 to 2463 m, Base Quaternay is defined as deep as 2393 m. At this depth the base of the Glacigenic sediments are found. At the Tulipan location the oldest glacigenic slide event is the NSFS-1 which has an age of about 1.5 Mya which agian corresponds in time with the Base Quaternary. This would only imply some erosion, reworking and resedimentation of Pliocene sediments somewhere at some stage in the development of the North Sea Fan.

Upper Quaternary sediments were drilled down to 1960 m with returns to the sea floor, and the lithology is inferred from the MWD logs, drilling parameters, cuttings samples taken by the ROV at sea bed in the 6302/6-U-1 well. The sediments seem to be dominated by soft to firm sandy to silty clays with some minor stringers of sand.

The 17” section represented the lower part of the Quaternary sediments and consisted of clay with minor sand layers. The clay was predominantly very fine grained sandy and silty with traces of glauconite and shell fragments. The sand consisted of loose quartz and rock fragments with glauconite and shell fragments. The grain size was mainly very fine to fine with traces of coarse grains.

Kai Formation **2463 – 2582 m MD (2438 – 2557 m TVD MSL)**

System: Tertiary
Serie: Middle – Late Miocene
Depositional environment: Marine shelfal - bathyal

The Kai Formation consisted of claystone and ooze, with minor sand lenses.

The clay was varicoloured, predominantly medium dark grey becoming more brownish grey to olive grey and occasionally dark greenish grey from 2500 m. It was soft to firm, amorphous to sub blocky and sticky. The claystone was silty, in part sandy and had traces of glauconite, micropyrite, micromica and traces of foraminifers. It was non to moderately calcareous.

The expected ooze sediment in the cuttings was not recognizable. However, the MWD, wireline logs and shale density measurement indicates an ooze type of sediment. A postwell XRD analysis shows that ooze sedimets starts somewhere below 2500 m (in the middle of the Kai Formation).

The quartz grains were generally clear to translucent, occasionally yellow and orange, very fine to fine. They were well sorted and the grains were sub angular to sub rounded.

The traces of limestone were dark yellowish grey, angular, hard and micritic.

HORDALAND GROUP 2582 – 3223 m MD (2557 – 3198 m TVD MSL)

The top of the Hordaland Group is picked at a trend shift towards lower values in the gamma ray log. The Hordaland Group comprises the Brygge Formation.

Brygge Formation 2582 – 3223 m MD (2557 – 3198 m TVD MSL)

System: Tertiary
Serie: Late Oligocene – Early Miocene
Depositional environment: Marine shelfal - bathyal

The Brygge Formation consisted mainly of claystone and ooze sediments, with traces of siltstone, sandstone and limestone.

The claystone was brownish grey to olive grey, occasionally lighter brownish to greenish grey. It was soft to firm, amorphous to sub blocky, silty and had trace of glauconite and micropyrite. The claystone was non to moderately calcareous, but occasionally very calcareous.

The traces of sandstone quartz grains were clear to translucent, very fine to fine, well sorted, sub angular to sub rounded.

The traces of limestone were dark yellowish brown, angular, hard and micritic.
The siltstone was light brownish grey to pale yellowish brown, firm and angular to blocky. Generally it was noncalcareous.

Brygge Fm below Opal A/CT 2774 – 3223 m MD (2749 - 3198 m TVD MSL)

System: Tertiary
Serie: Early Eocene - Late Oligocene
Depositional environment: Marine outer shelfal - bathyal

The opal A/CT transition was observed at 2774 m. It is characterised by an increase in gamma ray and resistivity, and also on the drilling parameters by a drop in ROP and an increase in

WOB. This boundary indicates a diagenetic change and a general increased hardness of the rock. It is unknown if the pelagic components are decreasing with depth from this boundary, but the log data is generally pointing in that direction.

The claystone was olive black occasionally brownish grey to olive grey, dark greenish grey, firm to moderately hard, subblocky, occasionally blocky, non to slightly calcareous.

A different claystone (from approximately 2990 m) was medium light grey to medium grey, occasionally greenish grey. It was very soft, occasionally firm, locally slightly silty and good traces of Glauconite and Pyrite. The claystone was non calcareous. According to a postwell XRD analysis of the Kai and Brygge Formations, this change corresponds to the disappearance of ooze at 2978 m.

Traces of sandstone appeared as clear to translucent quartz grains, very fine to fine, well sorted, sub angular to subrounded, loose.

Traces of siltstone and limestone occurred. The siltstone was light greenish grey, light brownish grey, occasionally pale grey, firm, blocky, non calcareous. The limestone was generally light brown to yellowish brow, also light grey, moderately hard to hard.

ROGALAND GROUP **3223 – 4080 m MD (3198 – 4055 m TVD MSL)**

The top of the Rogaland Group is picked from log correlation of gamma ray and resistivity with the reference wells.

The Rogaland Group comprises the Tare and Tang Formations. Both the Tare and Tang Formations is again split in two units

Tare Formation **3223 - 3395 m MD (3198 – 3370 m TVD MSL)**

System: Tertiary
Serie: Late Paleocene - Early Eocene
Depositional environment: Restricted marine shelfal

The Tare Formation is devided into four stratigraphic units. The lithological description covers the intervals from the Tare Formation (TEo MFS 170) and down to Intra Tare Formation (TEo MFS 155), and from Intra Tare Formation (TEo MFS 155) and down to Tang Formation (TPa MFS 115).

In general, the Tare Formation consisted of tuffaceous claystone, starting out to be a very varicoloured claystone in the upper parts and becoming less varicoloured in the lower parts. There are traces and stinger of sandstone and limestone throughout the formation.

Tare Formation / TEo MFS 170 3223 – 3313 m MD (3198 – 3288 m TVD MSL)

System: Tertiary
Serie: Early Eocene
Depositional environment: Restricted marine shelfal

The claystone was greenish grey to dark greenish grey, medium light grey to medium grey, occasionally medium bluish grey, dark greyish brown to brownish black to reddish brown. It was generally soft to firm and occasionally moderately hard. It was also micromicritic and micropyritic.

Tuffaceous claystone was not described at wellsite. Analysis onshore of the sidewall cores proved tuffaceous material from the top of the Tare Formation.

Towards the Intra Tare Formation / TEo MFS 155, the claystone was pyritic, silty and sandy in part.

Intra Tare Formation / MFS 155 3313 – 3395 m MD (3288 – 3370 m TVD MSL)

System: Tertiary
Serie: Late Paleocene
Depositional environment: Restricted marine shelfal

The Intra Tare Formation consisted of tuffaceous claystone with stringers of limestone and dolomite. The tuffaceous claystone is also present in the Tang Formation below. There were traces of igneous rock at one level.

The tuffaceous claystone was light grey to olive grey, brown grey, green grey, soft to firm, black specks and locally ashy texture. It was further non calcareous, in parts calc, occasionally silty and had traces of Pyrite.

The limestone was very light grey to light grey, moderate hard, subblocky, crumbly, microcrystalline and argillaceous. Locally it was yellow brown, hard, and grading into dolomite.

The traces of igneous rock were pale green, specks, locally very hard, generally vitreous, locally calcareous cement. Minerals like Quartz, Biotite and Pyrite was present.

Tang Formation (TPa MFS 115) 3395 - 4080 m MD (3370 – 4055 m TVD MSL)

System: Tertiary
Serie: Early - Late Paleocene
Depositional environment: Open marine shelfal - bathyal

The Tang Formation is comprises the TPa MFS 115, TPa MFS 90, Seland (TPa MFS 80), TPa MFS 60 (Top Danian) and Danian Sandstone events, and consisted of tuffaceous claystone to claystone with stringers of limestone and minor sandstone in the upper parts and interbedded sandstone and claystone in the lower parts .

The tuffaceous claystone was light grey, olive grey to blue grey, locally ashy with black and white speckle. Below 3570 m the tuffaceous claystone disappeared, and the predominant formation was a brown grey to dusky brown and olive grey claystone. It was generally soft to firm, pyritic, and silty to sandy in part.

The limestone was light grey to white grey and minor pale yellow brown, soft to firm and locally hard, occasionally argillaceous and in part dolomitic.

The sandstone was very fine, hard, well cemented with calcite and silica cement, common glauconite and traces of mica. Also loose medium to coarse sand occurred.

Danian Sandstone **3901m - 4080m MD (3876 – 4055 m TVD MSL)**

System: Tertiary
Serie: Early Paleocene
Depositional environment: Open marine shelfal - bathyal

The Danian Sandstone consisted of interbedded sandstone and claystone, with traces of limestone. The interval from 3901 to 4002 m embrases the majority of the sandstone beds.

The sandstone consisted of loose, clear to translucent Quartz grains. The grain size was predominantly fine, occasionally medium and traces of coarse. The grains were sub-rounded to sub-angular, generally moderately to well sorted and slightly to very calcite cemented. The sandstone contains traces of pyrite and glauconite.

The claystone was medium dark grey to dark grey, soft to firm, and generally sub-blocky. It was generally calcareous.

SHETLAND GROUP **4080 – 4234 m MD (4055 – 4209 m TVD MSL)**

The top of the Shetland Group was determined by biostratigraphy. The Shetland Group comprises the Springar Formation.

Springar Formation **4080 – 4234 m MD (4055 – 4209 m TVD MSL)**

System: Cretaceous
Stage: Ealry – Late Maastrichtian
Depositional environment: Marine shelfal - bathyal

The Cretaceous section consisted of interbedded limestone/chalk and claystone down to approximately 4140 m. From this depth the lithology was dominated by claystone.

The claystone was medium dark grey to dark grey, soft, amorphous and generally calcareous. It was generally sticky and becoming very sticky towards the TD.

The limestone was very light grey to light grey, soft to firm, and generally sub-blocky to crumbly. It frequently contained glauconite.

The sandstone consisted of loose clear to translucent grains. The grains size was predominantly fine, but also medium and coarse. The grains were well sorted and sub-angular to sub-rounded. The sandstone contained traces of pyrite and glauconite.

TD at 4230 m MD (drillers depth) / 4234 m MD (loggers depth)

4.5 Hydrocarbon indications

All cuttings were returned to seabed while drilling down to 1960 m. No indications of hydrocarbons were observed by the ROV.

The advanced gas measurement-and interpretation system, Flair, was used as an additional tool for gas evaluation.

A slight increase in the background gas was seen from 1965 to 2160 m, where the gas level increased from 0.8 to 1.8 %, all C1. At 2160 m the mud weight was increased from 1.21 sg to 1.23 sg. This had an impact on the general gas level, which decreased to 0.3 - 0.7 %, all C1. Thin scattered sand beds were present in the top hole in both the U-1 and the respud well. These did not seem to contain gas. No gas bubbles were observed at seabed during the water flows.

The 14 ¾”x17” was drilled with a mudweight from 1.25 to 1.33 sg. The background gas increased from 0.5 % to a maximum of 0.9 % around 2780 m. A gas peak of 1.68 %, mainly C1 was recorded at 2759 m. C2 and C3 components appeared around 2500 m. No shows were observed in the cuttings.

The 12 ¼” section was drilled with a 1.40 sg mudweight. There was a gradual increase in the background gas in Brygge and Tare Fm from 0.4 to 1.9 % at 3528 m. The background gas decreased then to 0.8-1 % before increasing again in Tang Formation, reaching 1.9 % at section TD at 3839 m. Heavy components also increased towards section TD. In addition, the aromatics Benzene and Toluene showed the similar increase. No shows were observed in the cuttings.

The 8 ½” section was drilled with 1.47 sg mud until arriving at core point at 3903 m (driller’s depth). Due to this mud weight increase, the general background gas started out low from 0.11 %. It increased to 0.34 % just above the reservoir. Bottom up from the top reservoir gave a gas peak of 3.24 %, which together with the high resistivity values, indicated hydrocarbons. It is

likely that the gas peak, to a certain degree, also was triggered by the short trip that was done before circulating bottoms up. The mud weight was increased to 1.56 sg, resulting in very low gas reading for the rest of the well. No shows were seen on the cuttings. The sandstone beds in the cores (when looked at in the laboratory) and the sidewall cores showed very weak signs of shows, appearing as faint odour and weak residual fluorescence. The heavy gas components such as Benzene and Toluene was presence down to around 3912-13 m, were they dropped to zero.

Table 4.3 Gas peaks (drillers depth)

Depth	Depth	Peak	Type	Background %	Chromatographic analysis (ppm)						
m MD	m TVD	%			C1	C2	C3	i-C4	n-C4	i-C5	n-C5
2190.0	2190.0	1.43	Formation gas	0.6	12580						
2192.0	2192.0	1.10	Formation gas	0.6	11000						
2295.0	2295.0	0.14	Formation gas	0.02	1374						
2377.0	2377.0	1.00	Trip gas	0.25	7000						
2390.0	2390.0	2.20	Short trip gas	0.7	21000						
2394.0	2394.0	0.30	Pumps off gas	0.08	2983						
2471.0	2471.0	0.78	Formation gas	0.54	7615						
2647.0	2647.0	0.85	Formation gas	0.65	8039	20	4				
2759.0	2759.0	1.68	Formation gas	1	15256	47	9				
2782.0	2782.0	1.31	Formation gas	0.86	12335	57	14				
2790.0	2790.0	1.29	Formation gas	0.8	11938	60	21				
2793.0	2793.0	1.06	Connection gas	0.39	10137	43	16				
2822.0	2822.0	0.54	Pumps off gas	0.24	5186	41	23				
2822.0	2822.0	0.96	Connection gas	0.43	9190	40	24				
3118.0	3118.0	2.35	Pumps off gas	0.5	15440	106	7	1	1	1	1
3126.0	2126.0	1.65	Connection gas	0.4	13382	107	7	1	1	1	1
3171.0	3171.0	1.36	Formation gas	0.6	2547	16		2	1		
3317.0	3317.0	1.66	Formation gas	0.8	15613	220	22	5	4	8	4
3389.0	3389.0	2.59	Formation gas	1	23300	317	46	9	6	6	2
3397.0	3397.0	2.30	Formation gas	1	17036	242	34	7	4	3	2
3789.0	3789.0	1.81	Formation gas	1.3	15698	575	252	48	47	18	27
3824.0	3824.0	2.35	Formation gas	1.9	19512	773	346	59	62	20	28
3835.0	3835.0	2.95	Formation gas	1.9	24066	958	455	80	85	25	35
3839.0	3839.0	3.35	Trip gas	1.1	29677	735	290	55	58	17	7
3839.0	3839.0	1.94	Short trip gas	0.8	16131	602	286	53	53	18	25
3841.0	3841.0	6.23	Trip gas	2	61304	1553	560	86	91	26	27
3842.0	3842.0	2.34	Trip gas	0.5	20673	572	252	50	49	19	27
3903.0	3903.0	3.24	Formation gas	0.31	26682	1136	568	92	113	26	15
3903.0	3903.0	15.80	Short trip gas	0.16	132402	5446	2926	543	672	167	108
3904.0	3904.0	0.65	Trip gas	0.11	5798	217	91	14	16	8	4
3907.0	3907.0	0.29	Trip gas	0.1	2501	113	40	7	10	6	3
3912.0	3912.0	0.52	Formation gas	0.22	4440	179	75	11	14	6	3
3915.0	3915.0	0.33	Trip gas	0.07	2794	111	48	9	11	6	4
3915.0	3915.0	0.21	Formation gas	0.18	1743	75	32	6	8	5	4
3919.0	3919.0	1.36	Formation gas	0.09	11868	475	224	33	40	12	8
3927.0	3927.0	2.14	Formation gas	0.2	18038	702	348	58	70	18	13
3932.0	3932.0	1.98	Formation gas	0.5	16401	691	343	56	68	20	11
3949.0	3949.0	1.40	Formation gas	0.5	11505	478	237	36	41	11	4
4088.0	4088.0	0.24	Formation gas	0.14	2055	67	25	5	7	4	3

4.6 Geophysical results

As showed in Figure 4.6, most of the observed formation tops came in shallower than expected (this was first identified, on MWD data, towards the base of the North Sea Fan, and further confirmed by wireline logging in 17 1/2 " section). Throughout the drilling of 6302/6-1 the formation tops came consistently shallower than prognosed. Overestimation of interval velocities in the original velocity model was the reason for this. Even though there is a considerable discrepancy between the original formation top prognosis and the actual results, this caused no operational problem due to continuous updating of the prognosis during the operation based on integration of incoming VSP and other velocity wireline data. Consequently, the casing depths were set as planned according to the pore pressure prognosis.

There is a 217 m discrepancy between the prognosed and actual depth at Base Ooze. This results from an absolute comparison. The prognosed reflector was the deepest indicator of a Base Ooze (Figure 4.2). The actual Base Ooze, which was proved by a postwell analysis, is coinciding with the reflector 150 msec. above the prognosed reflector, hence the large discrepancy in meters. In the planning phase, it was important for formation integrity to set the 13 3/8” casing shoe at least below the Opal A/CT and at best below Base Ooze. To set the casing deep enough for this purpose, the lower reflector was chosen as the prognosed one.

In the planning phase, the actual Base Ooze reflector was from a purely geological and geophysical point of view the best alternative. However, this existing uncertainty and wish to drill into for confident formation integrity lead to the prognosis of the deepest reflector.

The Base Tertiary reflector was prognosed at the base of a thick reflection peak (i.e. increase in acoustic impedance). The actual Base Tertiary correlates with the top of this reflection peak. Hence, there is a slight discrepancy between the prognosed and actual Base Tertiary.

Figure 4.1 Hydrocarbon indications

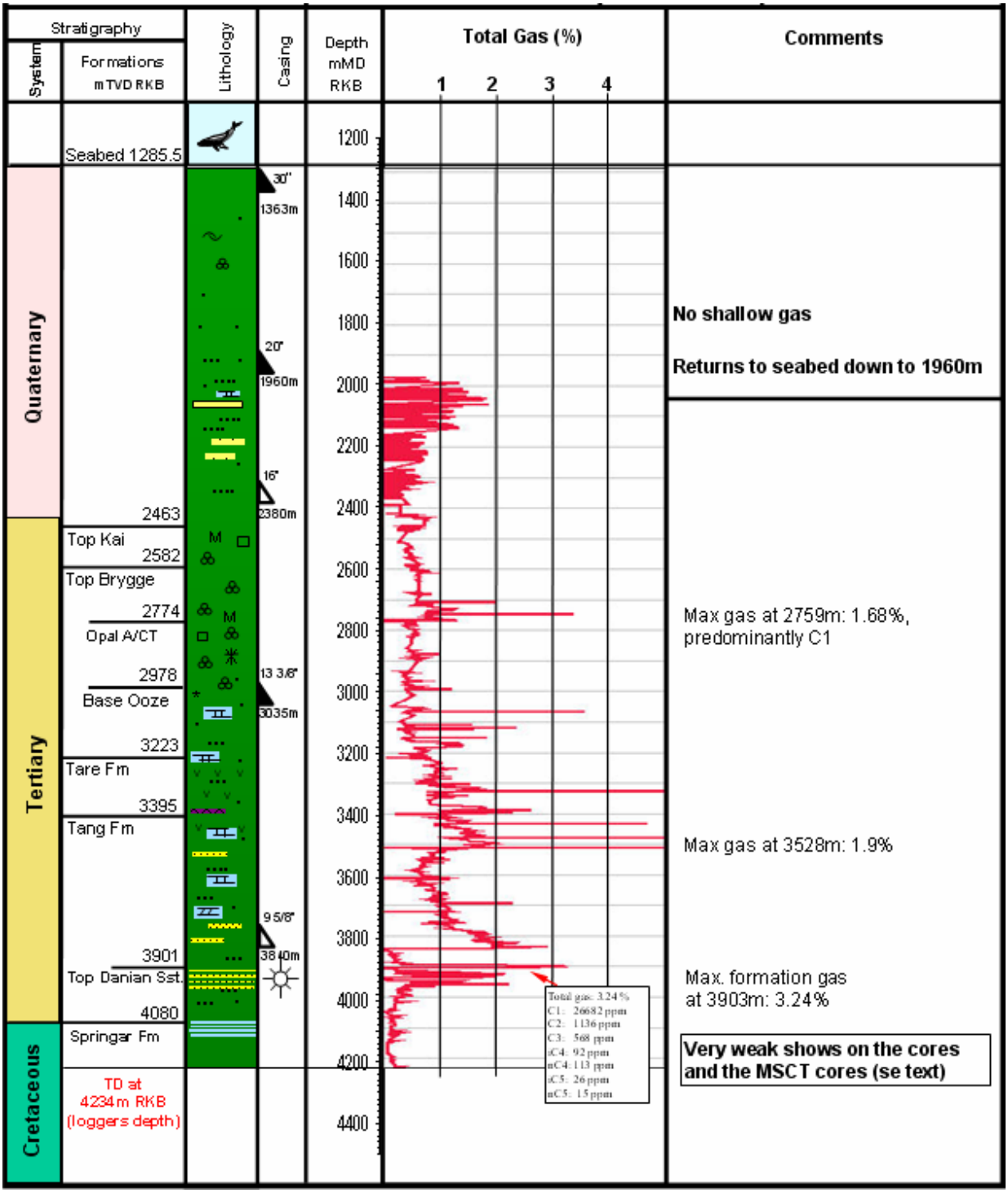
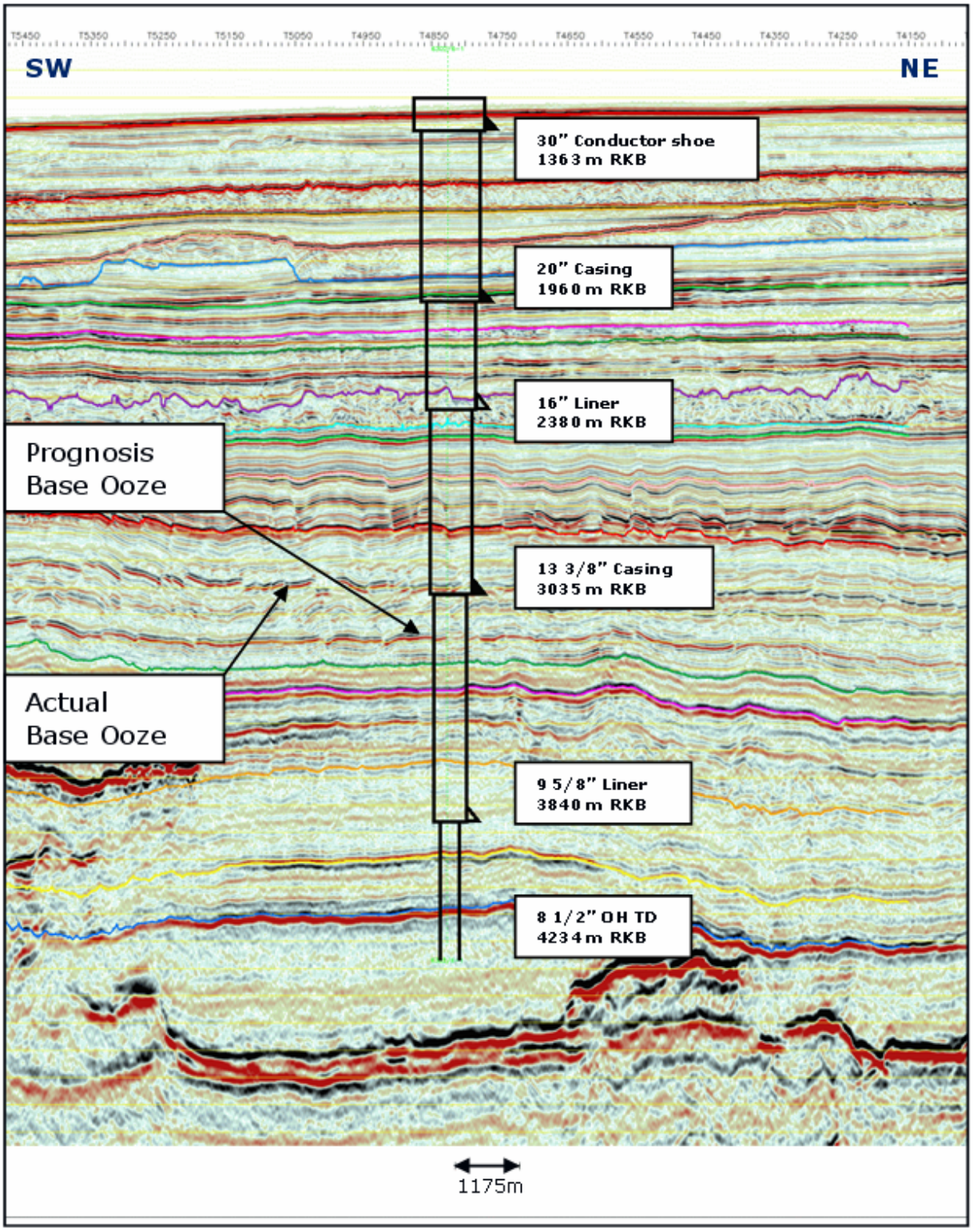


Figure 4.2 Seismic line



4.7 Data acquisition

4.7.1 Cuttings and mud samples

In addition to standard mud logging, enhanced gas logging was performed using Geoservices Flair system (details in Final Well Reports, Geoservices).

Table 4.4 Cuttings and mud sampling

Depth/intervall (driller depth)	Cuttings intervall	Geochemical	Mud
1970 – 2250	5		
2250 – 3842	10		100
3846 – 4230	3	20	100/20

4.7.2 Conventional coring

Table 4.5 Coring summary (drillers depth*).

Core#	Bit#	Depth intervall m MD	Rec. m	Rec. %	Barrel type/length	Barrel util. %	Spec. Preserv.	Tracer	Comment
1	7	3903 – 3911.6	7.9	91.9	Al / 27	29.3	No	Y	Jammed
2	7RR	3911.6 – 3918.5	4.7	67.1	Al / 27	17.4	No	Y	Jammed
3	7RR	3936 - 3941.5	3.1	56.4	Al / 27	11.5	No	Y	Jammed

** The cores are shifted down 3.25, 2.9 and 3.5 m, respectively. This is done by comparing the Gamma Ray core log against the wireline Gamma Ray log.*

The coring was done using conventional coring equipment. Optional telescopic coring equipment was available on the rig, but was not required.

The cutting of cores and handling on drill floor and pipe deck went according as planned. Further handling as marking, 1-meter cutting, drilling of core plugs was also done on the rig.

Core no. 1 was cut from 3903 to 3911.6 m. A 27 m core barrel was run. The core jammed off before filling the barrel. ROP during coring was around 1 m/hr. Core recovery was 7.9 m out of 8.6m – 92 %. Little gas was seen during core # 1, 0.69 % trip gas with max gas while drilling of 0.29 %.

Core no. 2 was cut from 3911.6 to 3918.5 m. A 27 m core barrel was run. The core jammed off before filling the barrel. ROP during coring was around 1.5 m/hr. Core recovery was 4.7 m out of 6.9 m – 68 %. During this coring run, gas reading reached a total of 0.5 % over background of 0.2 %. This core contained sandstone only in the uppermost part.

After core no. 2 was retrieved it was decided to continue drilling for a potential better reservoir unit. The criteria was to drill 4 m into the next sand, confirm with the gamma ray and resistivity logs, high gas readings and sandstone from bottom up sample. The well drilled 6 m into sandstone and had 40-50 m/hr drilling rate when it was decided to cut a third core.

Core no. 3 was cut from 3936 to 3941.5 m. A 27 m core barrel was run. The core jammed off before filling the barrel. ROP during coring was around 1.1 m/hr. Core recovery was 56 %, 3.1 m out of a total cored interval of 5.5 m. No gas peaks were reported during cutting core #3. Apart of the last half meter it contained only shale. The sandstone at the bottom was cemented.

During coring, a severe clay balling problem was seen, both on the core bit and the core barrel. This caused a very slow penetration rate in the clay layers, and ultimately, when breaking into a sandstone layer with relatively high weight on the bit, the core bit was unable to cut efficiently and the core jammed off. The clay sticking on steel was also seen in shallower sections of the well, such as inside casing and on the drill pipe. It must be explained to be an incompatibility between the clay cuttings and mud.

4.7.3 MWD

Table 4.6a: MWD logging - Well 6302/6-U-1

RUN no.	Depth interval (m driller depth)	COLLAR DIAM.	TOOL TYPE	COMMENTS
1	1366 – 2122	8 ¼”	MPR	POOH due to water kick. TD.
2	2122 – 2122	8 ¼”	MPR	Re-run whole BHA for wiper trip.

Table 4.6b: MWD logging - Well 6302/6- 1

RUN no.	Depth interval (m drillers depth)	Collar diameter	Tool type	Comments
3	1366.5 – 1965	8 ¼”	MPR/DCP	26” hole section. Data OK
4	1965 - 1968	8 ¼”	MPR/DCP	Short run due to no LOT obtained.
5	1968 - 2390	8 ¼”	MPR/DCP	17” hole section. Data OK
6	1965 - 2390	8 ¼”	MPR/DCP	Under reaming 17” section to 20” hole.
7	2390 - 3046	8 ¼”	MPR/DCP	14 ¾” section
8	2390 - 3046	8 ¼”	MPR/DCP	14 ¾” x 17 ½” section
9	3046 - 3049	8 ¼”	MPR/DCP	12 ¼” section. LOT misrun.
10	3049 – 3842	8 ¼”	MPR/DCP	12 ¼” section
12	3842 - 3903	8 ¼”	MPR/DCP	8 1/2” section.
15	3918 - 3936	8 ¼”	MPR/DCP	8 1/2” section
17	3941.5 - 4230	8 ¼”	MPR/DCP	8 1/2” section

4.7.4 Wireline logging

Schlumberger performed open hole wireline logging in 14 3/8"x17 ½", 12 ¼" and 8 ½" sections. Totally 12 successful runs and two misruns were performed. On the two misruns the toolstring stopped inside the casing. Significant "clay balling" in the DSI centralizers were observed when the tool came to surface. In both instances reaming in casing was performed before re-entering the well with the toolstring, no problems were observed when re-entering.

Complete overview over the logging runs is in Table 4.7. Composite logs are presented in Figure 4.9a and in the enclosures.

Table 4.7 Wireline logging program

LOGGING PROGRAM			
No#	**TOOL COMBINATION**	**RUN**	**INTERVAL (M)**
17" section			
1	PEX-DSI-HRLA	MISRUN	Tool stopped inside 16" liner @2195
1	PEX-DSI-HRLA	1A	2319.7 – 3018.3
2	CSI	2	1305 – 3015
12 ¼" section			
1	PEX-DSI-HRLA	MISRUN	Tool stopped inside 13 3/8"csg @2680
1	PEX-DSI-HRLA	2B	3035 – 3844.5
2	MSCT	2A	3124.8 – 3826.5, rec.: 19/25 cores
8 ½" section			
1	PEX-HRLA-CMR-HNGS	3A	3200 – 4230
2	FMI-MSIP	3A	3600 – 4230
3	MDT, pressure points and sampling	3A	3902.2 – 4139.5
4	MSCT	3A	3901 – 4218, rec.: 49/51 cores
5	MDT sampling	3B	3937
6	MSCT	3B	3939 – 4218.8, rec.: 38/41 cores
7	CSI	3A	2000 – 4225
8	MDT dual packer	3C	3920.8 – 3968

4.7.5 Data quality

Even though operational problems with equipment were encountered, high quality data was gathered from all wireline logging runs.

Very good zero offset VSP data was collected, which covers the interval from TD to 1315 m.

Totally 3 runs with sidewall cores (MSCT) were performed, all with very high success rate.

Significant stick slip was experienced on run 2 in the 8 ½" section (FMI-MSIP). The friction between callipers/centralizers and the borehole wall was such that the skipping was observed with the actual logging speed. This resulted in sections with missing data. Processing of MSIP data have compensated for this, the FMI log does however have some sections with poor imaging.

High quality gas and water samples were acquired in Danian sandstone in the 8 ½" section.

The Tritium content in the mud was not held constant during drilling of the 8 ½" hole. The concentration was however, frequently measured. Never the less, it created an uncertainty in the level of contamination in the water samples.

High sulphate value in the mud was observed, which generates uncertainty to the Ba^{2+} level in the formation water.

The MWD logging performance was satisfactory and the general data quality was good.

The recovered cores cut in Danian sandstone, however small, were of very good quality.

4.8 Formation pressure

An extensive pore pressure follow up was performed in this well. Available real time data, drilling parameter and MWD, were used in combination with the reference data to estimate the pore pressure during drilling. Pore pressure revisions based on wireline log data (sonic and resistivity) were done at each section TD from 2380 m, and based on pressure measurements data, MDT, in the reservoir section. Good consistencies are seen between the resistivity data and the sonic data for pore pressure calculations; hence the MWD resistivity data combined with the drilling information was confirmed to be useful during the real time pore pressure follow up. Further, apart from the pore pressure causing the shallow water kick and the depth where the pore pressure started to deviate from normal hydrostatic, the pore pressure prognosis experienced to be fairly consistent with the final pore pressure estimation.

A normal pore pressure gradient is estimated from seabed and down to approx. 2090-2100 m where a rapid increase in pore pressure close to 1.19 g/cm^3 was experienced. This pressure is based on the mud weight required to kill the water kick in the first well track, 6302/6-U-1, at 2100 m (equivalent to the sand/sandy clay at 2102 m in the well 6302/6-1), and also partly confirmed by the interpretation of the resistivity data.

After cementing the 20" casing at 1960 m in the well 6302/6-1, a small water flow was observed at the sea bed, outside the casing. This indicated a pore pressure above normal hydrostatic gradient somewhere above 1960m, and most likely from the interval 1937-1950 m, where the MWD logs indicate porous formation. However, a flow check at 1958 m, when

drilling the well track 6302/6-U-1, confirmed no indications of water influx neither on the down hole pressure sub nor from visual inspection at the sea bed. The well 6302/6-1 was drilled approx. 60 m from the well track 6302/6-U-1 and the U-1 well was still flowing when drilling the well 6302/6-1. Cross flowing from U-1 well track into a shallower layer and into the well 6302/6-1 is believed to be a possible reason for the water flow in the well 6302/6-1.

The pressure is most likely dropping to approximately 1.06 g/cm^3 below 2120m, with a slight increase to 1.08 g/cm^3 within the next few hundred meters of Naust Formation. Then a further pressure increase to approximately 1.17 g/cm^3 towards the base of the Naust Formation and close to 1.20 g/cm^3 when entering into the Brygge Formation at 2582 m are estimated. A more or less linear increase of the pore pressure is calculated throughout the Brygge Formation and reaching a maximum of 1.32 g/cm^3 at 3160 m, followed by a slight decrease to 1.31 g/cm^3 when entering into the Tare Formation at 3223 m. No significant changes in the pore pressure are seen in the Tare Formation. A slight decrease to 1.30 g/cm^3 before a minor increase to 1.32 g/cm^3 is estimated when approaching and entering into the Tang Fm. at 3395 m. A gradual increase in the pore pressure to 1.35 – 1.36 g/cm^3 is estimated in the Tang Formation down to approximately 3800 m. From this depth gradual changes in the formation characteristics are identified, reflected as increased formation velocity (sonic) and - resistivity logs values and increased formation gas.
The changes in the resistivity- and sonic log responses may be interpreted as a transition zone where a possible trend line shift with respect to pore pressure calculation is required.
Background gas increase from 1.0 – 2.0 %, with a peak of 2.95 % and a maximum trip gas (short trip to casing shoe) of 6.23 % close to the 12 ¼" section TD were measured. However, no connection gas was observed. Based on the background gas, the pore pressure estimate at the 12 ¼" section TD is assumed to be close to 1.38 g/cm^3.

A further increase in pore pressure to almost 1.46 g/cm^3 at top Danian reservoir was confirmed from formation pressure measurements (557.48 bar at 3902.2 m). This pressure was fairly in accordance with the prognosis, taking into account a possible pressure increase in the reservoir compared to the estimated overlaying shale pressure.

Following the reservoir pressure regime to the lowest pressure measurement at 4070.2 m, just above the Springar Formation at 4080 m, a pore pressure equivalent to 1.44 g/cm^3 was measured.

A slight decrease to 1.42 – 1.43 g/cm^3 is estimated further into the Springar Formationo and towards the TD of the well at 4234 m.

Pressure profile is presented in Figure 4.7.

4.8.1 Reservoir pressure summary and sampling

The reservoir sandstones were in general of variable quality, which caused some problems to find intervals with sufficient properties to get good quality pressure readings from the MDT log.

Totally 3 MDT run were performed in the well (Table 4.7-8).
The first run was a combined pressure and sampling run. 30 pressure points were attempted. Out of these, 10 were good, 1 was unstable, 1 was supercharged, 1 had lost seal, while 17 showed a tight formation. Samples were taken at 3952.2m and 3903 m.
The second run was a sampling run. Two attempts were done before finding an interval with good mobility. Samples were collected at 3937 m.
The third run was primary a sampling run with dual packer, and samples were collected at 3920.8 m. Pressure points were collected before scanning and sampling to check if the mobility was sufficient. Four of these pressure points had no seal and 7 showed a tight formation. A total of 4 pressure points were collected in this run.

The formation pressure measurements are plotted in Figure 4.8. The water gradient in the reservoir is estimated to 0.99 g/cm3.

Table with pressure points are enclosed in Appendix D.

4.9 Reservoir fluid sampling

Samples were collected in the Danian Sandstone. Gas samples were encountered at depth 3903 and 3952.2 m. The other two samples at 3937 and 3920.8 m proved formation water.

Table 4.8 Reservoir fluid samples

Sample depth	Run No.	Chamber	Drawdown	Formation Pressure	Pump Volume*	Dead volume	Opening pressure	Remarks
(m MD)		(volume)	(bar)	(bar)	(litres)	cc	(bar)	
3952.2	3A	1 Gal	25.1	561.088	70	-	482.63	+Geochemical 8395-2
3952.2	3A	420 cc	24.8	561.088	76	16.2	482.63	
3952.2	3A	420 cc	24.5	561.088	82	15.7	506.76	
3952.2	3A	420 cc	24.1	561.088	87.3	14.8	482.63	Used offshore
3903.0	3A	1 Gal	13.7	557.281	163	-	503.32	+ Geochemical B-319
3903.0	3A	420 cc	1.6	557.281	67*	10.9	506.76	
3903.0	3A	420 cc	1.5	557.281	75*	13.9	489.53	
3903.0	3A	420 cc	1.9	557.281	83.4*	14	496.42	
3937.0	3B	420 cc	140	559.717	15	14	44.2	Mud filtrate
3937.0	3B	1 Gal	240	559.717	78	-	91.8	Emptied offshore
3937.0	3B	1 Gal	211	559.717	88	-	62	
3920.8	3C	420 cc	60	358	275	16.2	112	
3920.8	3C	420 cc	40	358	363	15.7	116	
3920.8	3C	420 cc	39	358	378	13.9	126	
3920.8	3C	1 Gal	40	358	435	-	129	100 ml used in analysis

4.10 Leak off test

Three formation integrity tests (FIT); at 1972 m (below 20" casing), at 2419 m (25 m below the 16" liner and at 3052 m (below 13 3/8" casing). There were two leak-off tests (LOT), at 2394 m (below 16" liner) and at 3845 m (below 9 5/8" liner), were performed in this well. The FITs were done after squeeze cementing of the casing shoes due to initially poor cement jobs. The FIT pressure below the 20" and 13 3/8" casings were 1.29 g/cm^3 and 1.49 g/cm^3 equivalent mud weight respectively. The LOT below the 16" casing and 9 5/8" liner were interpreted to 1.60 g/cm^3 and 1.72 g/cm^3 equivalent mud weight respectively. The LOT below the 16" shoe was performed after spotting 8 m^3 high solids pill on bottom, and this is a possible reason why a considerable higher LOT value than expected was obtained. The LOT below the 9 5/8" shoe was performed according to standard procedures with mud, and resulted in a LOT value as expected.

4.11 Formation temperature

Table 4.9 Well 6302/6-1: Measured and corrected formation temperatures

Tool Combination	Run	Depth (m TVD RKB)	Max recorded temp. (^{0}C)	Time since circulation (hrs)	Corrected temperature (^{0}C)
PEXlite-RES-DSI	1A	3018	42	8.9 (35.9 since TD)	
VSP-GR	1A	3018	42	18.0 (45.0 since TD)	
PEXlite-RES-DSI	2B	3844.5	70	14.5 (20.5 since TD)	87 ^{0}C at 3825 m (TD)
MSCT-GR	2A	3826.5	78	30.0 (36.0 since TD)	
PEX-HRLA-HNGS-CMR+	3A	4234	98	19.5	112 ^{0}C at 4225 m (TD)
FMI-MSIP	3A	4234	100	31.3	
MSCT-GR	3B	4225	108	83.5	
MSCT-GR	3C	4225	109	107.5	
VSP-GR	3B	4225	109	125.7	
MDT-GR	3A	4140.5	101	49.1	
MDT-GR	3B	3937	108	89.4	
MDT-GR	3C	3968	99	168.7	

MDT sampling	Run	Depth of measurement (m TVD RKB)	Max recorded temperature (^{0}C)	Time since circulation (hrs)	Duration of pumping (hrs)	Approx. volume pumped (litre)
MDT-probe	3A	3903	84.1	59.92	3.42	163+83.4
MDT-probe	3A	3952.2	89.4	55.17	3.75	87.3
MDT-probe	3B	3937	96.4	101.35	11.35	88
MDT-dual packer	3C	3920.8	97.6	168.08	13	435

4.12 Experiences / recommendations

Drilling mud (MI Glydrill for deepwater)

- No hole stability problems were experienced throughout the entire operation. The hole was still in good condition after 170 hrs. of wireline logging.
- Significant incompatibility was experienced between clay and the mud. Swelling of clay cuttings resulted in clay balling of the bit and clay sticking to casing. As a result of this incompatibility, low ROP and jamming was experienced during coring operations. Clay sticking in casing caused wireline misrun in 17 ½" and 12 ¼" section. In both cases the wireline tool was stuck inside casing when running in hole. The retracted tools showed clay balling inside DSI centralizers.

Tracer

- The tracer concentration was not kept constant during drilling of the reservoir section. However, there is sufficient documentation of tracer concentration vs. time for core analysis, but there is high uncertainty of contamination level on water samples.
- Recommendation to keep the tritium level constant when new mud is added to the active system is to add tritium to premix tank to required concentration level prior to mixing it into the active system.

Realtime data transmission:

- All data were displayed realtime in InterAct, Schlumberger system. The LWD data from BHI is transferred in WITS format to InterAct, hence no realtime update possible. This is a problem when corrections are necessary in the LWD data.
- Some problems experienced displaying certain MWD data in the InterAct due to interface between BHI and Geoservices.

Data acquisition

- MWD logs
  - Bentonite hivis sweep pills had big influence on the log quality in top hole section. Changing to CMC hivis pills eliminated this influence.
  - The Gamma Ray presented in the 26" section did not have the right corrections.
  - The LWD log was overall of good log quality. Little noise was experienced.
- Good VSP data collected from the whole well.
- MSCT
  - Totally 3 wireline runs for sidewall cores were performed. Exceptionally good core recovery.
- High quality hydrocarbons & water samples were acquired with single probe and dual packer.
- Cutting samples with ROV from the tophole was done
  - These samples proved useful for dating and confirming the geological model in the uppermost sediments.
- Hot shot biostratigraphic samples

- Due to uncertainty of picking Top Cretaceous, hot shot samples were sent to shore for dating. There was no problem related to this task.

- The advanced Gas measurement and interpretation tool, Flair system, was tested out in the well. Firstly, it gave useful experiences with equipment. Secondly, it added confidence to gas measurement and interpretation and increased the understanding of the reservoir.

Pore pressure estimation.

- MWD resistivity was used for real-time pore pressure interpretation. Post well analysis show good correspondence between pore pressure interpretation from resitivity and sonic logs.

Figure 4.3 Regional structural setting

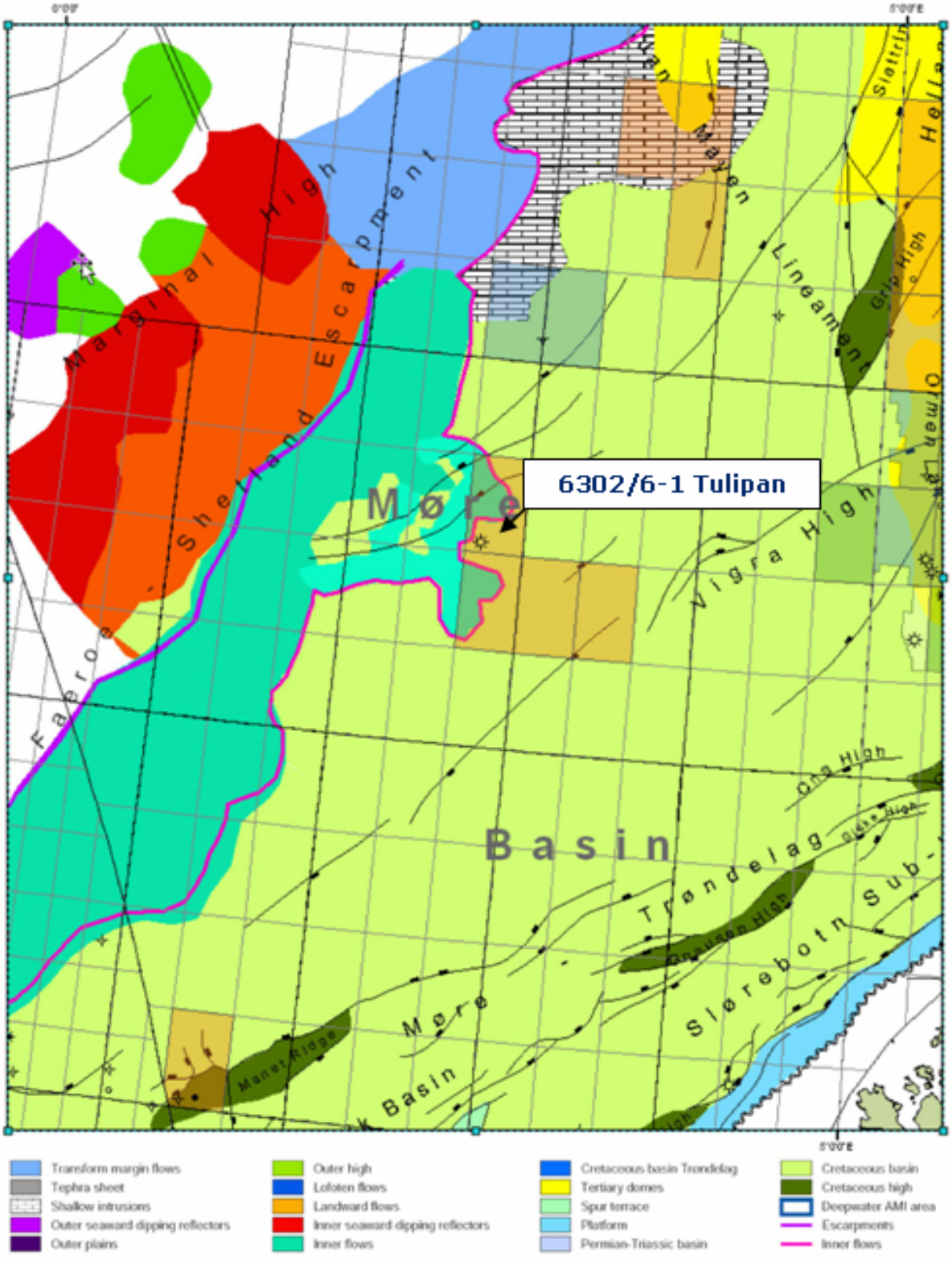


Figure 4.4 Well stratigraphy

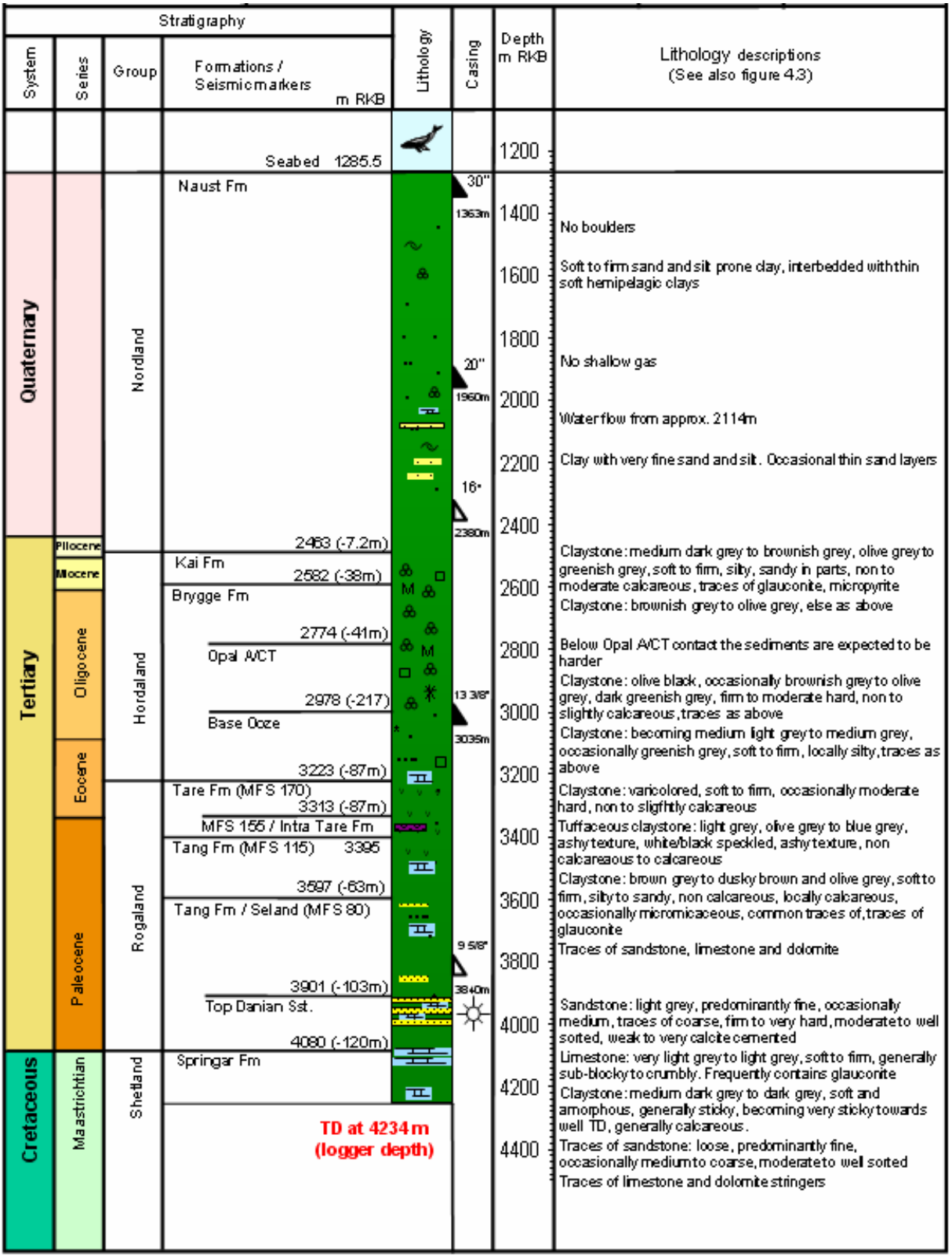


Figure 4.5 Reservoir section

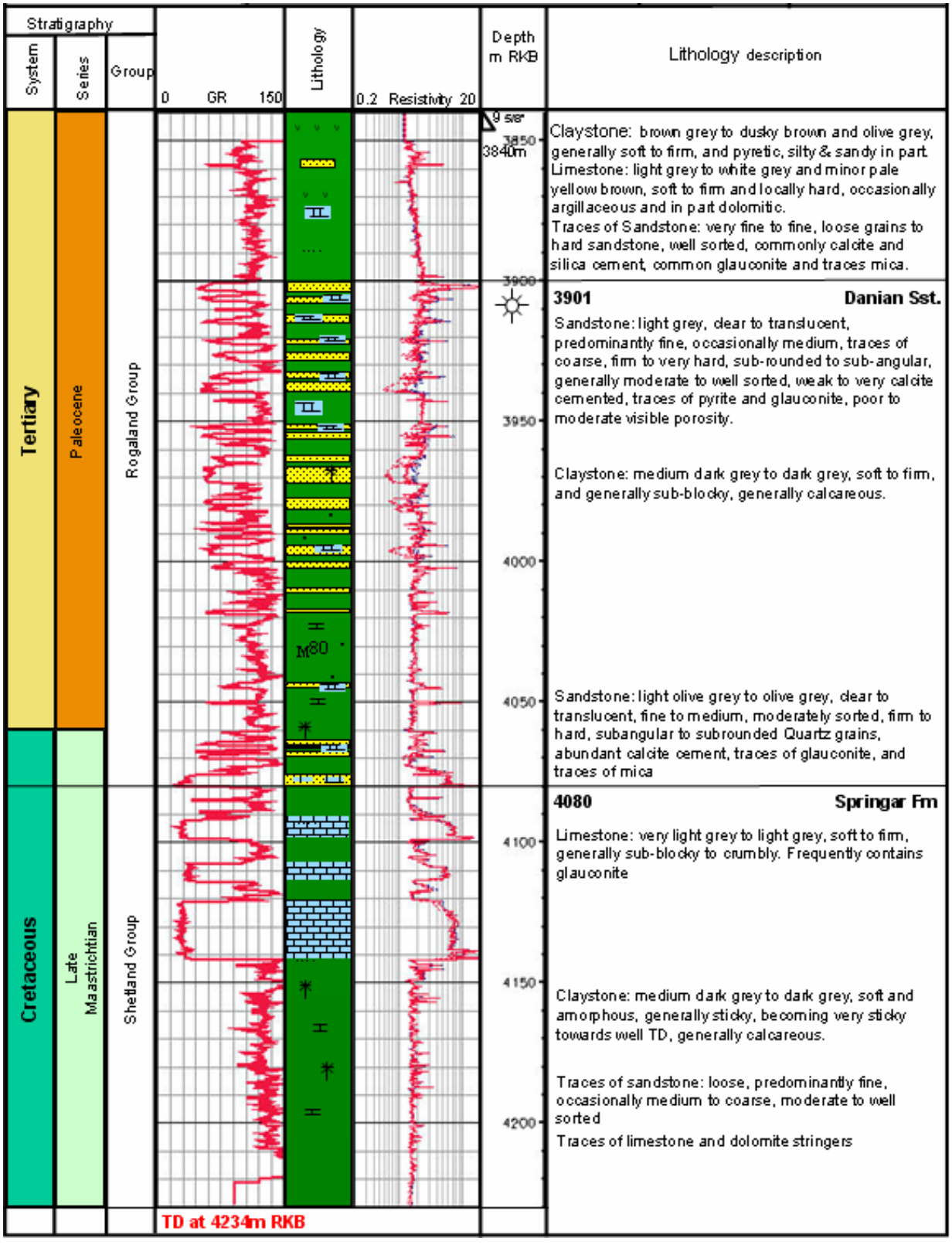


Figure 4.6 Prognosed vs. Actual

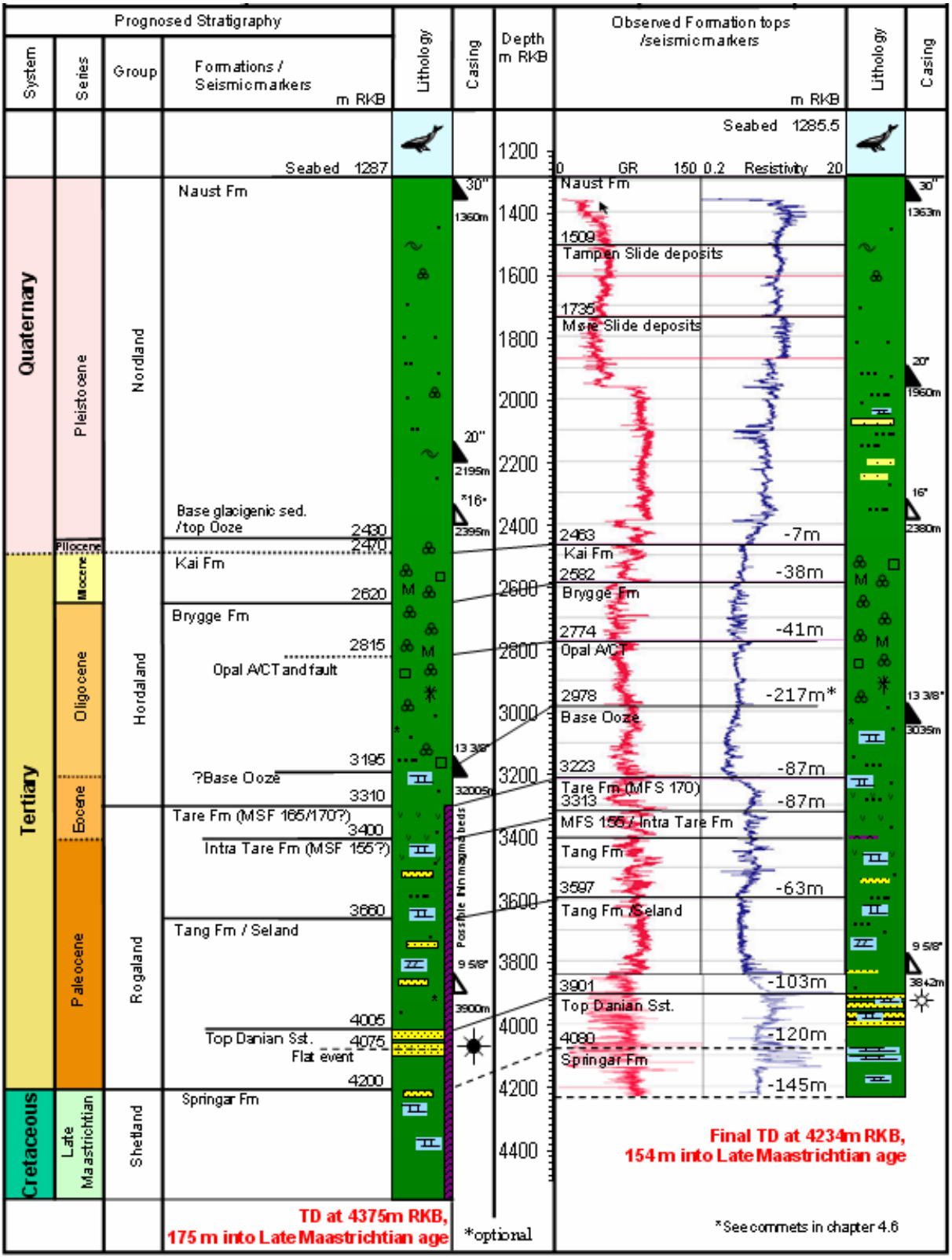


Figure 4.7 Pressure plot

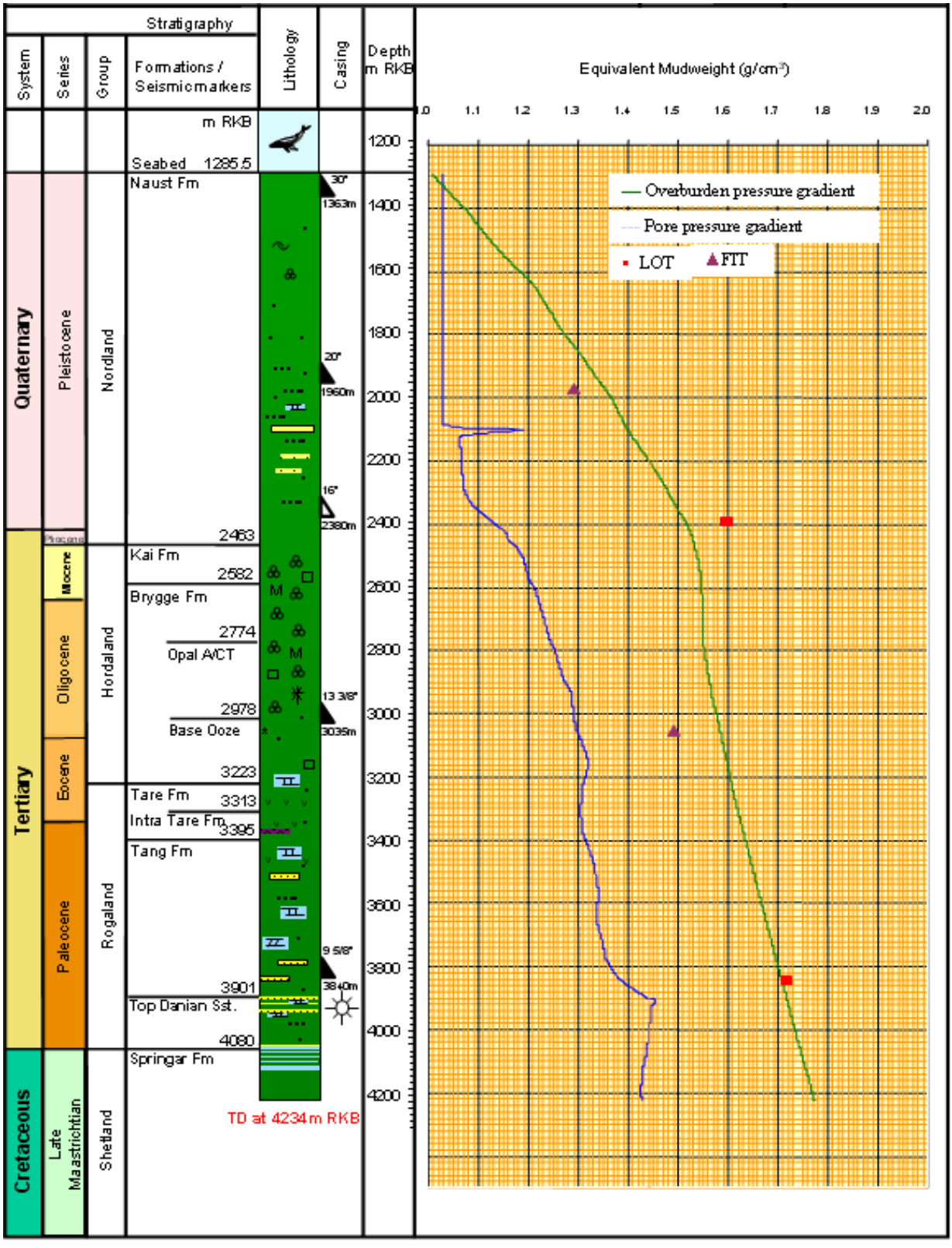


Figure 4.8 MDT plot

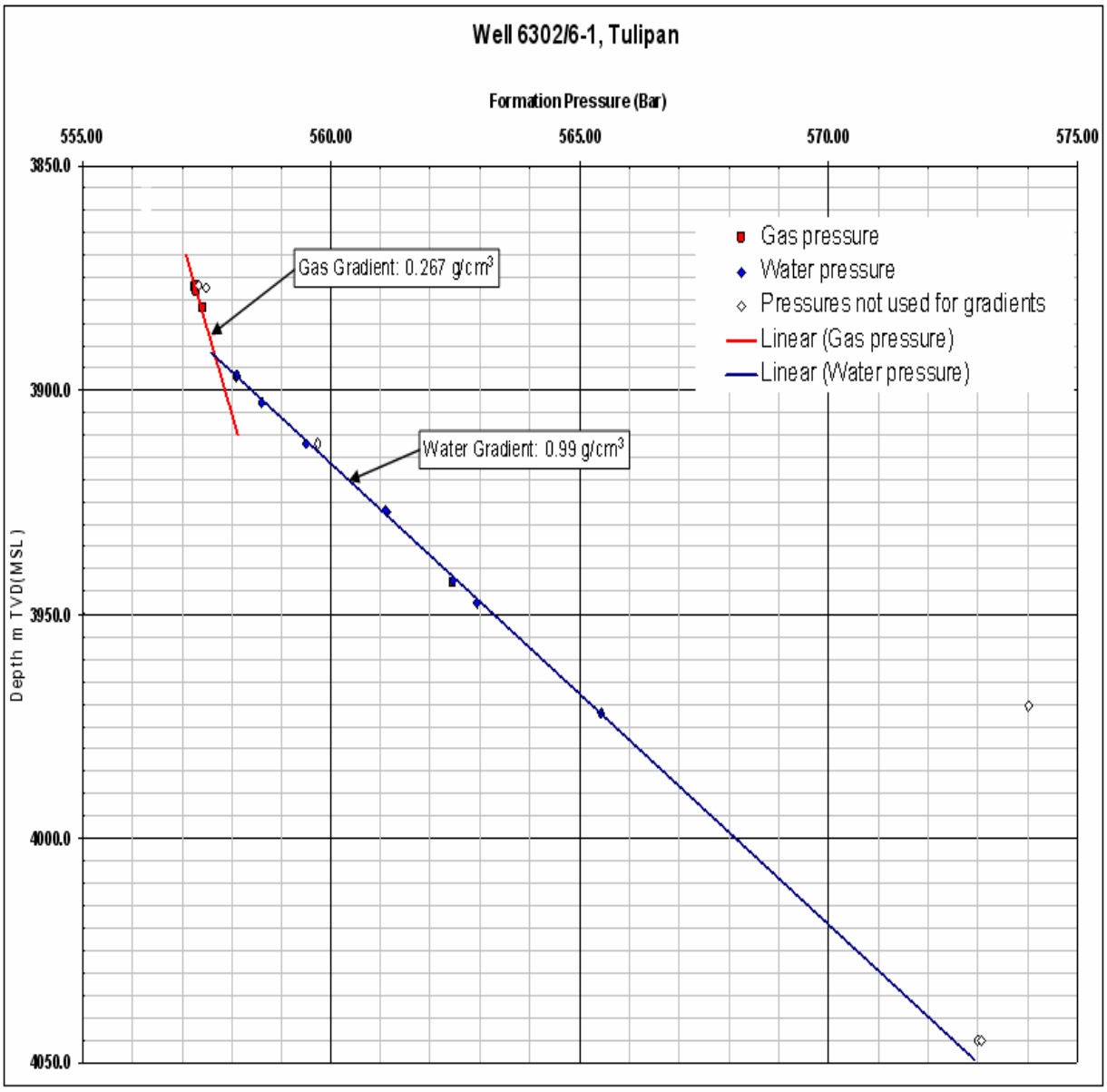


Figure 4.9a Composite data

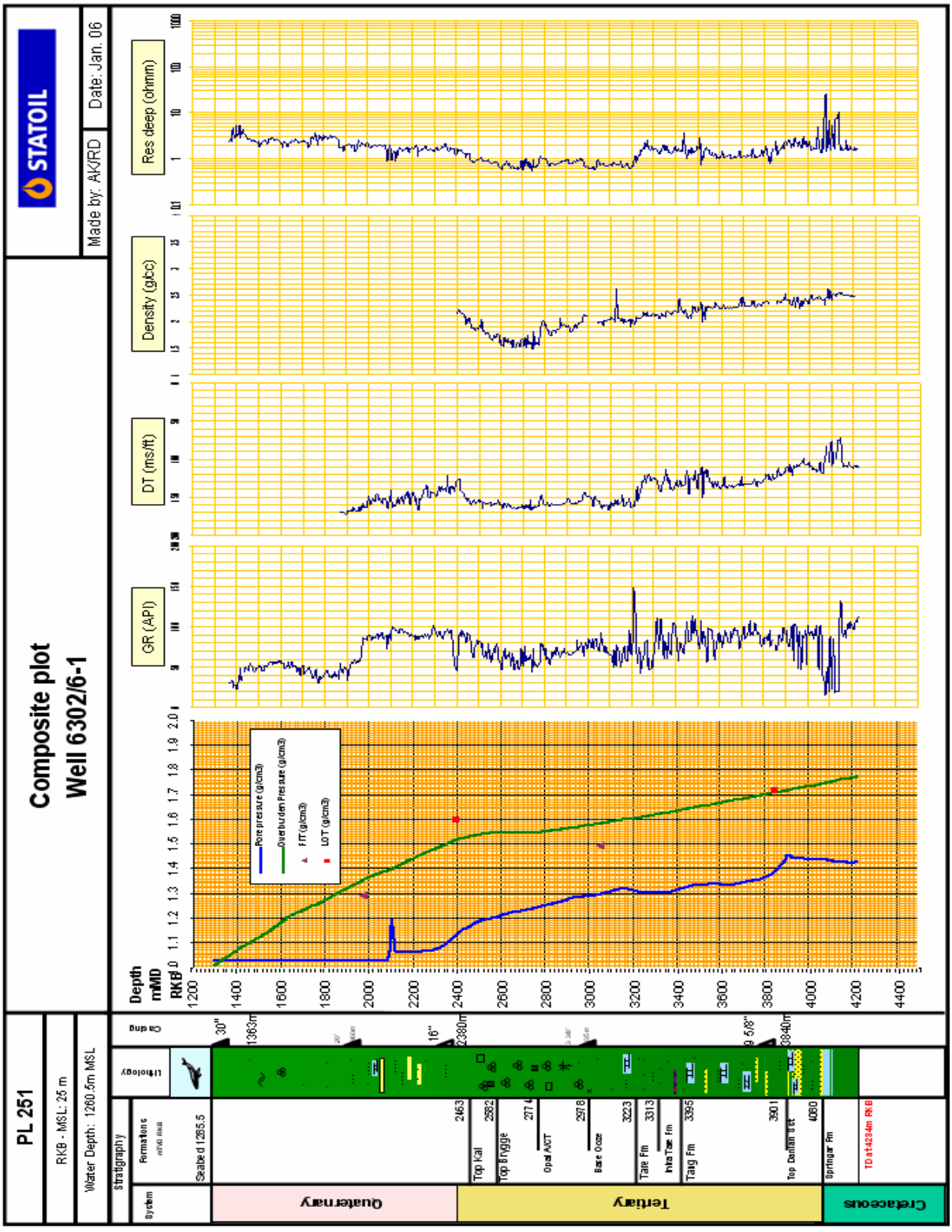


Figure 4.9b Composite plot

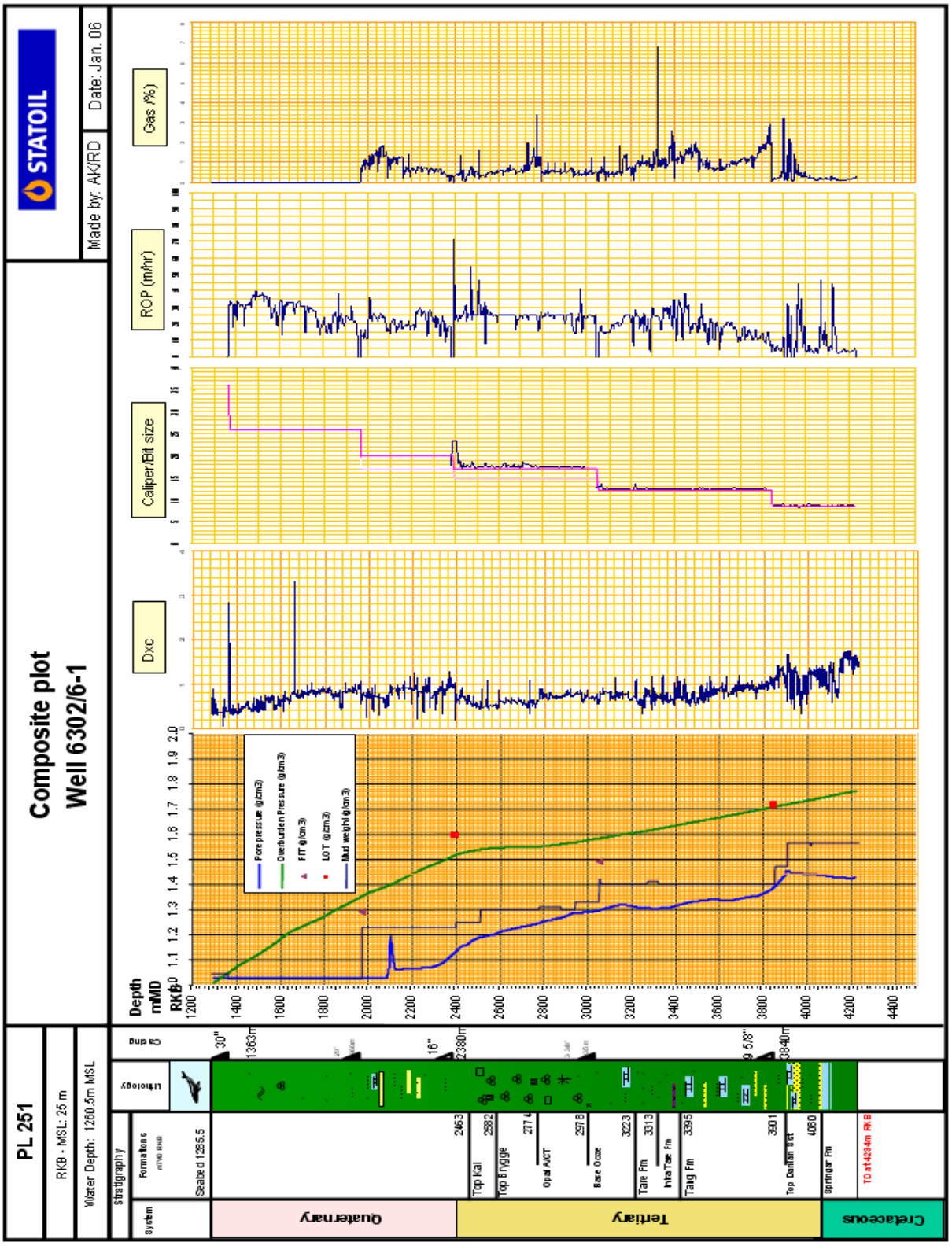
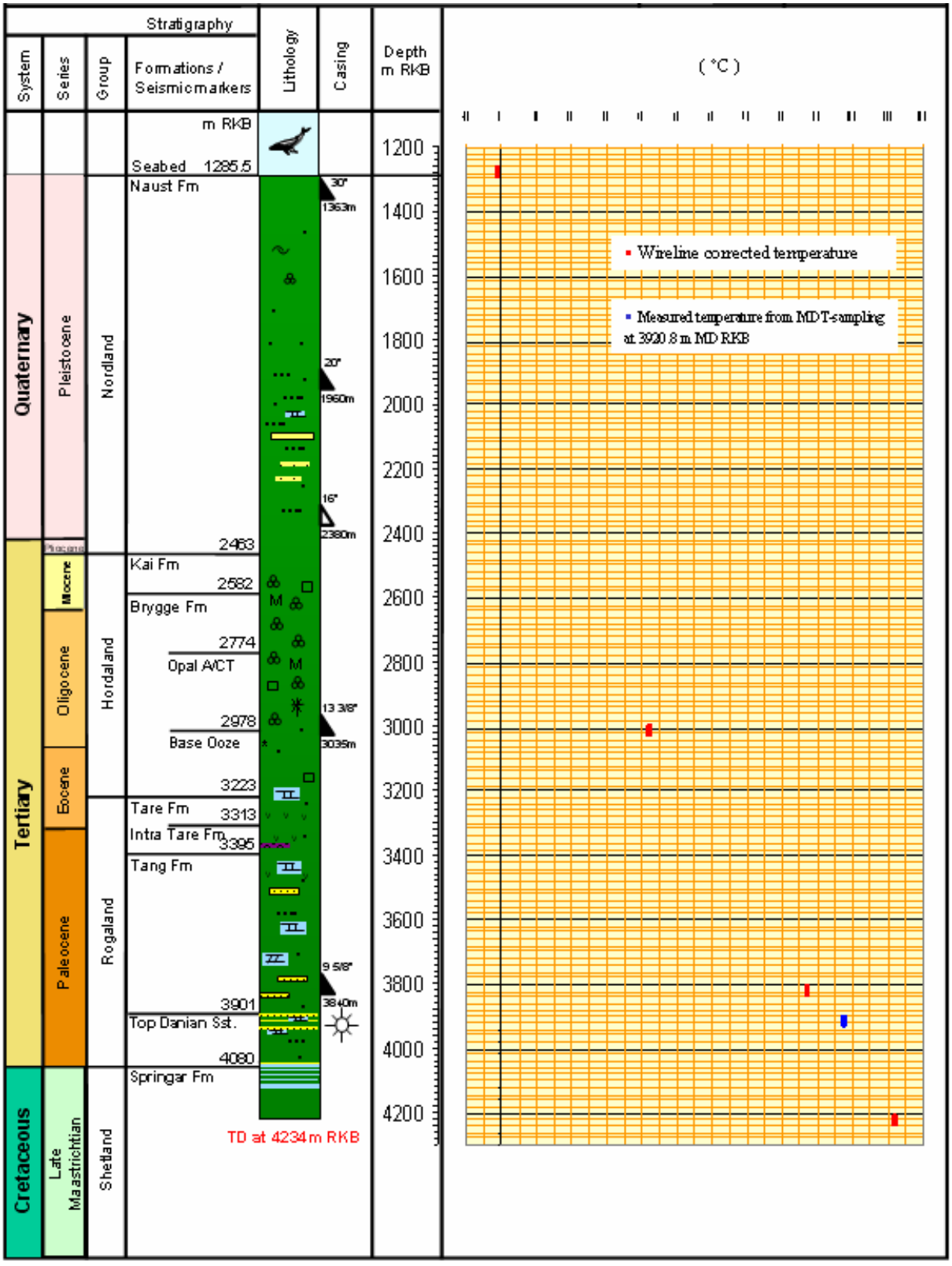


Figure 4.10 Temperature gradient



5 Drilling operations report

5.1 NO 6302/6-U-1, 42" x 36" (29.05.2005 16:30)

START: 29.05.2005 16:30 1284 m MD
END : 05.06.2005 00:30 1366 m MD

OBJECTIVE
Set conductor with less than 1.5 deg inclination and with sufficient length and cement bond to withstand loads from the BOP and subsequent casing strings.

Several of the reference wells had been forced to re-spud, in many cases due to hole angle outside acceptance criteria. It was therefore focused on drilling the top hole with low inclination rather than achieving high ROP.
In addition, it was desirable to get a minimum of 3 m conductor stick-up due to the amount of cuttings being produced during the drilling of a long 26" section and the potential improvement in visibility when having the WH elevated from the seabed. Last, because of very soft seabed, it was important to avoid large washouts that could compromise the formation structural support around the conductor.

DRILLING SUMMARY

Drilled 42" x 36" hole to 1366 m. No boulders and easily drilled formation. Low currents on location caused little "drag" on the DP (DP only 10 m of spud location relative to rig in 1260 m of water).

Generally, drilling the top-hole went very well. Avoided surface rotation until the 42" HO was 1 m above seabed and washed down the first 5 -10 m with max 2000 LPM, made the top-hole drilling a very smooth and controlled operation. Running the 42" hole opener with blinded nozzles proved to be ok with 4000 - 4500 LPM. Only a small amount of packed shale was found on the hole opener when it came to surface. It was virtually no wash-out.
Top-drive lowering speed was set to 15m/hr and virtually no WOB was seen during the entire section.

The Anderdrift tool functioned well, however a few surveys were re-taken when the measurements indicated too high inclination.

The hole was displaced hole to 1.35 sg bentonite mud prior to POOH and RIH with conductor.

Typical operating parameters: 2000 - 4600 LPM, 0-2 T WOB, 0-60 RPM. Inclination measurements 0 – 0.25 deg, with 0.25 at TD. Bulls-eyes showing 0.5 / 1.0 deg after the grouting job.

BIT RUNS
Drilled 17 1/2" x 26" x 36" x 42" section in one run. 17 1/2" EMS13 milled tooth bit from Reed Hycalog with IADC code 135.

DRILLING FLUID
Seawater and hivis. Pumped hivis pill every 15 m drilled. Displaced well to 1.35 sg bentonite mud before POOH.

CASING
Ran 1 joint of 36" LP housing and 5 joints of 30" conductor (including shoe joint) on 5" landing string with almost 3 m stickup. Conductor equipped with rubber sleeve to ease retrieval of the well head in the P&A phase.

MWD/BHA
Odfjell hole opener assembly, with motor above the 36" hole opener (dual 26"x36" hole opener).

CEMENTING
Tuned light slurry was selected for the conductor job on Tulipan due to potentially weak formation. 15 m3 of the planned 46 m3 of tuned light cement was mixed and pumped into hole when encountered problems transferring cement from Silo A. Several attempts were made to transfer cement from silo A with no success. The 15 m3 tuned light cement slurry was then displaced out of hole. Observed returns to seabed. Displaced the well to 1.35 sg mud while waiting to commence cement job. The well was later circulated with seawater.
Since there was only enough tuned light cement for one conductor job onboard the rig, the second cement job was performed with standard G-cement. Mixed and pumped 25 m3 1.56 sg lead cement, followed by 15 m3 1.95 sg tail cement. The cement was displaced with 14.1m³ of seawater using the cement pumps. Pumped 10.1 m3 of sea water at 1600 LPM followed by 4 m3 of seawater at 600 LPM. Waited on cement for 12 hours. ROV checked bulls eyes (0 and 0.25 deg), pulled out of 30" casing and flushed string.

To verify TOC in annulus, the cement stinger was guided on the outside of the conductor and ran into 1290 m without obstruction, 6 m below seabed. Mixed and pumped 21 m3 1.52 sg cement slurry and displaced with 9.2 m³ of seawater. Bulls eyes showing 0.5 and 1 deg after the grouting job. Pulled out of hole to 1260 m, dropped sponge ball and circulated string clean with 5000 LPM before POOH.

5.2 NO 6302/6-U-1, 26" (05.06.2005 00:30)

START: 05.06.2005 00:30 1366 m MD
END : 23.06.2005 14:30 2122 m MD

DRILLING SUMMARY
MU 26" BHA and run to 1220 m, tested MWD with 3000 LPM and stabbed into the 36" conductor. Washed down with 500 LPM and tagged cement at 1357 m with 2 T. Drilled firm cement from 1357 m to 1363 m.

The 26" hole was then drilled from 1366 m to 1958 m with 4000 - 4500 LPM, 165 - 202 Bar, 120-125 RPM, 5 - 20 kNm, 1 - 5 T WOB, ROP 23.4 m/hr. Cuttings samples were taken at frequent intervals using the ROV.

Prepared to pull ROV due to hydraulic leakage. Pumped 20 m³ hi-vis pill and displaced out of hole. Flow checked well, well static. Displaced hole to 1.20 sg mud. Flow check well for 15 min, well static. Retrieved ROV to surface and refilled oil.

Drilled 26" hole from 1958 m to 2044 m and observed high torque during reaming before connection at 1986 m, max 30 kNm. Worked hole twice and pumped 10 m³ hi-vis and circulated same above BHA prior to continue drilling. Drilled 26" hole from 2044 m to 2122 m. Max inclination 0.89 deg. Pumped 2 x 10 m³ hi-vis pill each stand. Observed increasing ECD and water/mud flowing over the 36" conductor housing.

Prepared and mixed 75 m³ 1.40 sg kill mud and 500 m³ 1.35 sg kill mud. Meanwhile pulled out 3 stand to 2045 m with no overpull. Pulled string slowly from 2045 m to 2016 m while circulating at 3000 LPM and 15 RPM. Attempted to increase solids in the well by reducing flow rate to 250 LPM with no reduction in influx flow rate. Attempted to RIH, but took 10 T weight immediately. Established circulation with 3000 LPM. Reamed down from 2045 m to 2119 m with 3000 LPM, 114 Bar, 65 RPM, 3-5 kNm torque. Pulled last stand without rotation/circulation. RIH with same parameters and hole seemed to be in good condition. Established circulation and pumped 75 m³ 1.40 sg kill mud followed by 500 m³ 1.35 sg kill mud at 4500 LPM. ECD increased from 1.12 sg to 1.176 sg at the end of circulation. Flow checked well with ROV, well stable.
Pulled the 26" BHA out of hole with controlled rate above the 30" conductor and topped up well with 1.35 sg mud prior to pulling out of the conductor. ROV observed well at 10:00 and 12:00, no flow. Observed well at 13:15 and the well was flowing.

RIH with open ended 5 ½" DP to 1000 m. Meanwhile, mixed and prepared 1.45 sg kill mud (maximum mixing rate 20m3/hr). Observed well flowing, same flow rate as at 13:15. Entered well and washed down to 1438 m with 400 LPM. Observed well static when not moving the pipe. Pulled out to shoe at 1361 m and flow checked with ROV, well flowing.

Continued RIH to 2100 m, tagged bottom and observed pressure build up. 1 m fill on bottom. Pumped 457 m³ 1.45 sg kill mud at 6755 LPM, 200 bar. Flow checked well with ROV, well stable. POOH at 6 min/stand and prepared to run 20" casing.

BIT RUNS
The 26" section was drilled in one run using a T11C milled tooth bit from Reed Hycalog with IADC code 115. Very soft and easily drilled formation. No presence of boulders nor difficulties to maintain vertical hole.

DRILLING FLUID
The section was drilled using seawater with bentonite hi-vis sweeps.

Prehydrated 80-90 kg/m3 bentonite hivis mud. 10 m3 hi-vis pills were pumped every 15 m drilled or as the hole dictated.

CASING
The 20" surface casing was run with a 20" NO-GO style adapter joint as a fixed land-off point for a 16" liner, 9 casing joints above the 20" casing shoe. The 20" NO-GO style adapter joint was run as part of the 20" casing because of a high possibility of running the 16" liner.

Ran the 20" casing and locked the 18 3/4" wellhead into the 36" LP housing.

After landing the 20" casing, a minor flow was observed through the cement return holes on the 36" housing. Observed well with the ROV for 1.5 days, but did not observe reduction in flow. Meanwhile prepared kill mud and repaired cement unit. When ready to kill the water influx, the flow had increased and was now flowing a less viscous fluid than before (possible sign that the mud was being water cut). Attempted killing the influx by pumping 200 m3 of 1.45 sg mud at 1800 LPM, but well kept flowing. The killing rate was based on Halliburton recommendations for not washing out the ball seat in the pre-installed wiper plugs in the 20" casing.

Continued observing the well with the ROV. Well still flowing. Killed the influx by pumping 30 m3 1.50 sg pill and 300 m3 of 1.47 sg at 4000 LPM. The killing rate was based on max dilution rates of mud by water. Well stable.

Prepared 300 m3 contingency mud to be able to displace the cement out of hole in case of cementing problems.

MWD/BHA
26" pendulum BHA.
MWD: GR, Res., Dir. and PWD.

CEMENTING
Started pumping Deep Water Flow Stop (DWFS) foam cement, but had to abort job because of cut in drill water supply and foam flowing back up to the surge tank. Displaced the 4m3 of cement out of the hole by pumping 300 m3 1.47 sg contingency mud.

Continued observing the well and refilling every hour. Well stable, but drilling fluid seeping slowly into the formation. Meanwhile, waited on boat from shore with more driling fluid for a second attempt on foam cementing the 20" casing.

Broke circulation and pumped 20 m3 1.47 sg spacer at 1800 LPM. Started pumping DWFS foam cement. Stopped and cleaned cement knife after having pumped 20 m3 and reset motor protection relay on the nitrogen feed pump. Had to stop a second time to clean the cement knife after having pumped 118 m3. Observed oil leakage on the cement unit diesel engine and refilled oil on the fly. Stopped and blew transfer lines after 139 m3. Aborted cementing operation when the cement knife became blocked again. Totally pumped 145 m3 of the

planned 193 m3 base cement slurry. 145 m3 1.70 sg base cement slurry (flow meter reading) is equivalent to 168 m3 1.47 sg DWFS down hole cement volume.

Dropped dart and chased down with 10.5 m3 freshwater and sheared top wiper plug with 164 bar. Theoretical displacement volume to shear wiper plug was estimated to 9.0 m3. The difference in displacement volume may be explained by by-pass-flow around the dart. However, since a positive indication of wiper plug release was seen, it was decided to continue displacing the wiper plug with the planned displacement volume of 144.3 m3 of freshwater. Returns were observed during the displacement job and stopped displacing without bumping plug.

Observed "cement smoke" coming out of the cement return holes on the 36" housing after finished displacing the cement. "Smoke" stopped after a while, but about 5 hours later observed flow out of 4 of the 6 cement return holes on the 36" housing. The flow then reduced and was observed to flow only from one of the holes around 14:00 the same day. Two hours later the flow increased to flow through 4 of the cement return holes again. At 17:00 the flow seemed to be thicken a bit and stopped intermittently before starting to flow again. Chunks of cement was flowing out of the cement return holes time at a time.

Rigged up to run riser and BOP while observing flow behaviour from the well. Ran BOP and riser, but aborted operation after decision was made to respud the well.

5.3 NO 6302/6-1, 42" x 36" (23.06.2005 14:30)

START: 23.06.2005 14:30 1285.5 m MD
END : 28.06.2005 02:00 1366.5 m MD

DRILLING SUMMARY
Same procedure and objectives as in 6302/6-U-1.
Inclination measurements 0-1 deg, with 0 deg at TD. Bulls-eyes showing 0 deg.
Well 6302/6-1 was re-spudded 62.5 m S - SW from the 6302/6-U-1 well.

BIT RUNS
Drilled 17 1/2" x 26" x 36" x 42" section in one run. 17 1/2" T13CDH rock bit from Reed Hycalog.

DRILLING FLUID
Seawater and hi-vis. Pumped hi-vis pill every 15m drilled. Displaced well to 1.35 sg bentonite mud before POOH.

CASING
Ran 1 joint of 36" LP housing and 5 joints of 30" conductor (including shoe joint) on 5" landing string with almost 3 m stickup. No rubber sleeve was mounted on the conductor string.

MWD/BHA

17 1/2" rock bit in combination with 26" x 36" x 42" hole opener with motor above the 36" hole opener.

CEMENTING
Mixed and pumped 37 m³ 1.56 sg lead and 15m³ 1,95 sg tail G-cement slurries. Displaced cement and WOC for 12 hrs. Released conductor running tool and stabbed into 42" x 36" annulus. RIH 10m and did not tag TOC.

Grouting conductor #1:
Due to problems while mixing cement, only 13 m³ out of the planned 20 m³ cement volume was pumped. The pump rate dropped from 670 LPM to 110 LPM, unable to mix more cement and aborted cementing. Pulled out of 36" x 42" annulus, flushed landing string and retrieved string to surface.

Made up 26" BHA and 18 3/4" wellhead running tool while waiting on repair of cement unit

Grouting conductor #2:
Stabbed into 42" x 36" annulus. Tagged hard cement 10 m below seabed on north side and 7 m on south side. Pumped 17 m3 1.90 sg cement slurry and displaced with 9 m3 of seawater at 1300 LPM. Dropped wiper ball and flushed landing string at 2800 LPM.

5.4 NO 6302/6-1, 26" (28.06.2005 02:00)

START: 28.06.2005 02:00 1366.5 m MD
END : 10.07.2005 16:30 1968 m MD

DRILLING SUMMARY
Drilled 26" section as in 6302/6-U-1. Set TD shallower due to flowing sand zone at 2114-2116 m. TD 1965 m MD. Max inclination 1.24 deg.

BIT RUNS
Both 26" sections were drilled in one run using the same IADC 115, T11C milled tooth bit from Reed Hycalog. Very soft and easily drilled formation. No presence of boulders nor difficulties to maintain vertical hole.

DRILLING FLUID
The section was drilled using seawater and bentonite hi-vis sweeps.

Prehydrated 80-90 kg/m3 bentonite high viscosity mud. 10 m3 hi-vis pills were pumped every 15m drilled or as the hole dictated. Mixed and displaced to 1.35 sg Bentonite fluid at TD, pumped 1.3 times the hole volume.

CASING
Large problems making up the 20" connections and laid out a total of 7 joints. More details can be found in synergy #325338. The JAM system indicated that the connection torque was far too high before shoulder was reached. After discussions with Weatherford and Tenaris it was

decided to increase the make up torque. Some of the connections required 22 kft-lbs up to 33 kft-lbs and this seemed to solve the problem.

No problems stabbing the 20" shoe into the 36" housing. No hole stability issues when running the 20" casing in open hole. OH was left 12-15 hours longer than planned because of the prolonged handling time of the 20" casing. This did not have any detrimental effects on the hole conditions.

MWD/BHA
26" pendulum BHA.
MWD: GR, Res., Dir. and PWD.

CEMENTING
Cementing the 20" casing went well, considering all the cementing problems experienced when cementing the conductor and 20" surface casing on the 6302/6-U-1 well. Pumped 159 m3 lead and 30 m3 tail slurry. Sheared wiper plug at theoretical volume and bumped plug.

Attempted to perform a LOT, but pressure leaked off at 4 bars. Observed losses on trip tank to 0.5 m3 per hour and decided to POOH and squeeze cement shoe. Squeezed 4.86 m3 cement into formation.

Drilled out cement from 1883 m to 1968 m. Reamed and cleaned section several times. Drilled 2 m new formation and performed FIT to 1.29 EMW: Sufficient to drill 17" x 20" hole and run 16" liner to approximately 2400 m.

5.5 NO 6302/6-1, 17"X20" (10.07.2005 16:30)

START: 10.07.2005 16:30 1968 m MD
END : 25.07.2005 23:00 2390 m MD

OBJECTIVE
The 16" liner option was planned as a contingency in case the 20" casing had to be set at a shallower depth than planned and/or the 20" LOT was insufficient to be able to drill the 17" section below the Opal A/CT reflector at 2815 m.

The main reason behind running the 16" liner was the poor LOT on the 20" casing shoe. The FIT to 1,29 sg after squeeze cementing the 20" casing was only sufficient to drill the 17" x 20" hole to approx. 2400 m and run a 16" liner.

DRILLING SUMMARY
The drilling went very well and the formation was easily drilled. Only a couple of spots were WOB had to be increased.

Drilled from 1968 m to 2159 m and experienced problems with air trapped in the mud (fluctuations in the stand pipe pressure and poor MWD mud telemetry). The problems with air in the active system were dealt with and ceased after approximately 12 hrs drilling.

Increased mudweight from 1,21sg to 1.23 sg at 2159 m and continued drilling 17" hole to TD at 2390 m. Had increasing ECD and pressure loss at times, stopped and reamed hole at 4000 LPM with 60 RPM. Observed heavy loads of cuttings over the shakers. Boosted riser at all times.
Circulated hole clean and back-reamed to shoe due to tight spots experienced when POOH. Circulated hole clean again, pumped slug and POOH.

Opened up 17" hole to 20" in a separate run. No problems activating nor operating the under-reaming assembly. However, very sticky clay cuttings on the shakers. POOH, experienced tight spots from 2377 - 2158 mMD and decided to ream the section again. Used the UR to clean out residual cement from the 20" shoe squeeze by reaming upwards inside the 20" casing. Pumped with min flow rate to keep the cutter arms open, plus 100 LPM to minimise potential damage to the 20" casing wall using the UR. This was done to have the cutter arms with a little "flex" inside the casing. The UR also has jet nozzles 90 degrees onto the casing wall so it is very important that the UR is always kept in motion to avoid jetting a hole. Under-reamed the 20" section a second time.

POOH, the UR BHA was completely covered with clay that had to be cut off by hand.

BIT RUNS
Due to the 16" no-go adapter joint being installed in the 20" casing, the maximum pass-through was 17,375". I.e. a 17" bit had to be run instead of a standard 17 1/2".

Clean out run with a 17 1/2" bit inside the 20" casing after liner top squeeze job: Tagged TOC at 1787 mMD (soft cement from 1787 m down to 1800 m). Drilled firm cement from 1800 m down to the TOL at 1838 m MD.

Drilled out the 20" shoe and to TD using a 17" Reed Hycalog EMS13GC bit.

DRILLING FLUID
Experienced loss in pump pressure due to air trapped in the mud in the beginning of the section. Additions of Defoam NS helped, but using Halliburton`s NF6 did have a better effect. After approximately 12 hrs drilling the problems ceased.

The foaming could be a result of the mud system being new, with no solids. This tend to increase possibility for foaming or air entrapment. A suggestion to reduce air in the mud/foaming is to run degasser while drilling out cement so that the mud system will not be aerated when starting to drill the new section.
A total of 691 m3 Glydril DW was discharged due to heavy contamination of spacer and green cement. Efforts were made to try to treat it back, but with no positive results. High cement content caused depletion of polymers and turned the mud into a jellyish substance that could not be treated back.

CASING

Ran the 16" liner hanger through the wellhead restriction at 30min/stand (Max OD on 16" hanger running tool is 17,528". This gave a clearance of 0.034"). Took no weight when running the 16" liner hanger through the wellhead.

Took weight when running the 3rd liner joint into where cement had been cleaned out inside the 20" casing (TOC after squeeze job was tagged at 1883 mMD). Initiated circulation carefully and circulated the liner down through the cemented area. It is understood that the tight hole was predominantly caused by the cement and not so much by the sticky clay. It is also a possibility that the UR did not clean out the cement inside the 20" casing properly. The remaining running of the 16" liner went very well. Landed on the no-go ring at 1840,2 mMD as planned, but could not get 20 T overpull as per Drill Quip procedures. It is believed that the latching profile inside the 20" adapter joint was completely filled up with clay such that the latching profile did not engage. Attempted to latch on and take new overpull 3 times without success.

Attempted to establish circulation, but started loosing returns. Had to pull the 16" liner 3 m above the no-go before successfully establishing circulation. Decided to cement the 16" liner at that depth and set it down on the no-go profile after the cement job.

MWD/BHA
17 x 20 UR BHA with bullnose and Smith Red Baron Rhino 16000 DTU underreamer.

CEMENTING
Originally planned to pump 33 m3 of cement, which would bring the cement up to the 20" shoe. However, due to the weak formation on the 20" casing shoe the cement volume was reduced. Pumped 27.3 m3 1.92 sg cement.
During the cement job, the flow out of the well head increased before white particles started coming up from the seabed. "Bumped" the top wiper plug 6.5 m3 early.

Landed (allegedly) the liner hanger back onto the no-go after cementing. Released the running tool and POOH according to Drill Quip procedures. Got mud contaminated with cement when circulating hole clean after the cement job. Therefore a possibility that the seal assembly area was covered in cement. Decided to RIH with the Drill Quip mill and flush tool to clean seal area. However, when the TOL was tagged, it was found that the liner hanger was indeed landed 1,44 m high. Hence not possible to land the seal at the correct place and achieve a proper seal between the 16" liner hanger and the 20" casing. Decided to squeeze cement the 16" liner lap.

RIH and performed an injectivity test with 1.23 sg mud. Observed an increase in flow out of the wellhead when pressuring up. Injection pressure dropped when flow out of wellhead started and increased correspondingly when the flow stopped. Tried to pressure up to the casing test pressure (120 bar with 1.23 sg mud in hole), but pressure leaked off before reaching 100 bar. A steady increase in the flow out of the wellhead was observed. Decided to continue with the squeeze job.

Sat a balanced cement plug on top of a 100 m hi-vis pill, inside the 16" liner up to the TOL. Spotted a 17 m3 cement plug on top and managed to squeeze 7.1 m3 of cement into the liner

lap. Flow out of the wellhead increased when squeezing cement. Max squeeze pressure was 120 bar.

RIH with 17 1/2" bit and cleaned out cement to top of 16" liner.

Pressured up 20" casing/16" liner lap up to 95 bar with 1.23 sg mud using the rig pumps while monitoring the wellhead with the ROV. Flow out of the wellhead increased steadily when pressuring up. At 95 bar fluid suddenly squirted out of the cement return ports and the stand pipe pressure reduced to about 80 bar. After this, the flow out of the wellhead suddenly stopped. Carefully bled down pressure to avoid collapsing the liner. Pressured up to 120 bar on the second attempt and got a successful test.

Drilled out residual cement inside the top of the 16" liner after the liner squeeze cement job. Cleaned out approximately 3 m cement. Struck hard cement again at 2300 mMD, approximately 54 m above the float collar (cement and black rubber from the wiper plugs on the shakers). This may correlate with the error in volumes when displacing the top wiper plug on the 16" liner cement job. Had rapid pressure build up about 6.5 m3 early and was unable to continue displacing the cement. The reason behind this rapid pressure increase is unknown.

Established parameters and drilled float collar. This was performed with slow progress as the bit was spinning on top of the float (Spent a total of 6.5 hours on this operation). Drilled shoe track, shoe and cleaned out rat hole.

Placed a 8 m3 high solids pill at the shoe and performed a LOT equivalent to 1.60 sg.

5.6 NO 6302/6-1, 17 1/2" (25.07.2005 23:00)

START: 25.07.2005 23:00 2390 m MD
END : 11.08.2005 05:00 3052 m MD

DRILLING SUMMARY
Increased MW from 1.23 sg to 1.25 sg prior to start drilling new formation. Drilled 14 3/4" hole from 2394 m to 2419 m and took a FIT to 1.46 sg. The FIT was taken to prove formation integrity without high solids pill. Continued drilling 14 3/4" hole from 2419 m to 2728 m, increased MW to 1.30 sg at 2506 m.
Drilling parameters: 3500 LPM, 120 RPM, 5 kNm torque, 1 ton WOB. Average ROP 25 m/hr. Boosted riser continuously at 1000 LPM.

Continued drilling from 2728 m to TD at 3046 m, increased MW from 1.30 sg to 1.33 sg at 2937 m. Boosted riser continuously while drilling at 1500 LPM. Max ECD 1,37 sg. Observed increasing torque, pressure and ECD while drilling lower part of section. At TD circulated and conditioned mud and raised MW to 1.37 sg at 3500 LPM.

Experienced 15 - 20 T overpull when POOH with 14 3/4" drilling assembly. MU topdrive and pumped OOH at 1000 LPM to 2885 m. Observed 30 ton overpull at 2885 m, increased flow rate to 2000 LPM and back-reamed into 16" liner shoe with 2800 LPM, 3 - 10 kNm. Stopped

and circulated bottoms up every 300 m when back-reaming. Observed large volumes of cuttings in return.

Rigged up for running wireline string #1. RIH wireline string #1 to 2235 m, where the string held up inside the 16" liner. Worked string, but unable to run below 2235 m, 145 m above 16" shoe. POOH with wireline logging string and observed the centralisers packed with clay. Decided to open up the hole to 17 1/2" before commence wireline logging.

RIH with 14 3/4" x 17 1/2" UR BHA, activated under-reamer below the 16" liner. Added KCL powder to increase KCL content to improve clay inhibition. Under-reamed 14 3/4" hole to 17 1/2" from 2380 m to 3043 m. Parameters: 1 - 3 ton WOB, 3500 LPM, 145 RPM, 4 - 6 kNm torque, Max ECD 1,405 sg. Boosted riser at 2000 LPM. Circulated hole clean with 2 bottoms up at 3500 LPM while boosting riser at 2000 LPM. POOH to 2894 m, experienced tight hole. RIH to bottom, back-reamed to 2390 m. Circulated hole clean every 300 m back-reamed. Observed a lot of cavings over the shakers. Back-reamed inside 16" liner while boosting riser at 4500 LPM. Circulated hole clean above 16" liner top and observed a lot of cuttings over the shakers. POOH and prepared for wireline logging.

Retrieved the bore protector after the wireline logging. Used parameters for pumping down the kill line to verify retrieval of the bore protector. An index line measurement was made at retrieval depth as a reference point when running the 13 3/8" casing.

Dropped a 2 3/4" drift prior to start POOH to drift the landing string prior to cementing the 13 3/8". When the bore protector and pulling tool came to surface, the drift could not be found. The entire landing string was therefore drifted in the derrick. Cement lumps along the wall had hindered the drift from going through.

BIT RUNS
The 14 3/4" section was drilled with a T11C milled tooth bit from Reed Hycalog with IADC code 115 .
Opened up to 17 1/2" using a Smith Red Baron Rhino Under-reamer.

An MX-C03DX (aggressive insert bit) was used to drill out the 13 3/8" casing shoe. After the bit was pulled (due to shoe squeeze operations), questions were raised concerning the integrity of one of the bearings, and the bit was changed prior to running in hole to drill the section.

DRILLING FLUID
KCl concentrations were kept between 60 and 70 kg/m3 while drilling 14 3/4" hole. Increased KCl content to ~80kg/m3 when opening up to 17 ½". NaCl concentrations varied between 200-230 kg/m3.
Maximum MW 1.37 sg.

Composition of high solids pill: 1.40 sg, 115 kg/m3 (Mix II 35 kg/m3, G-Seal 500 kg/m3, CACO3 coarse 300 kg/m3)

CASING
Prior to rigging up for running 13 3/8" casing, the cement head was made up with a single below and laid out on deck.

Rigging up for running the casing took 3 hrs in total including the pre-job safety meeting. Making up the casing string went well, with up to 13 joint per hour (considered as acceptable running speed with the equipment in use). One joint had to be laid out due to damage during make-up.

After making up the hanger and removing casing handling equipment, the 13 3/8" was run on 5" landing string without any drag above 10 T. Experienced excessive drag 6-8 m prior to landing point. Circulation was established at 500 LPM with full returns. Made up cement stand and washed casing down with almost no drag. Lost 15 m3 of drilling fluid when washing down the casing.

Due to the heavy 13 3/8" casing string and the long landing string, the casing stretch was 1.6 m. This was not included in the detailed operational procedures and led to confusion around landing the 13 3/8" casing at the correct depth.

MWD/BHA
14 3/4" Pendulum BHA for the pilot section. The assembly functioned very well, no building tendencies were seen.

CEMENTING
While circulating prior to the cement job, partial losses were seen at 400 LPM. 40 m3 cement-contaminated mud was pumped down ahead of the spacer. Pumped 20 m3 1.65 sg spacer at 400 LPM. 8 m3 was lost in the process of pumping spacer and contaminated mud. The reason behind the losses are not conclusive, however plugging of the by-pass ports in the hanger due to shale particles mobilised when started circulation is a possible reason.

Dropped ball, mixed and pumped 19 m3 1,92 sg G-cement slurry at 800 LPM. Lost 8 m3 of drilling fluid. Released dart and launched top plug with 9 m3 of drilling fluid pumped with the cement unit. Lost additionally 2.5 m3 of drilling fluid. Displaced the cement at 1000 LPM with partial returns. Increased displacement rate to 2500 LPM as the spacer was entering the open hole. Still partial returns. Bumped top wiper plug and held 114 bar for 5 min. Lost 73.5 m3 of drilling fluid during the displacement of the cement and only a minor pressure increase was seen when displacing the cement.

When drilling out 13 3/8" shoetrack, no cement was seen above the wiper plugs nor in the shoetrack. Only soft cement found in the rat hole. Return samples contained 50/50 shale/cement, and the cement was easily breakable.

A leak-off test was attempted with 1.42 sg mud. Three repeats were made due to insufficient results (1.45-1.47sg). Maximum MWD ECD 1.474sg. Decided to squeeze cement shoe.

Placed a 11.5 m3 balanced cement plug and squeezed 950 L into the formation with up to 25 bar surface squeeze pressure. Losses were experienced while pumping and displacing the squeeze cement slurry. When drilling out the cement, firm cement was struck at 3023 m (13 m up from the 13 3/8" shoe). While drilling out the firm cement, the mud weight was cut back to 1.40 sg. Performed a FIT to 1.49 sg with a 10 m3 hi-vis pill in open-hole.

5.7 NO 6302/6-1, 12 1/4" (11.08.2005 05:00)

START: 11.08.2005 05:00 3052 m MD
END : 25.08.2005 22:00 3845 m MD

DRILLING SUMMARY
Drilled 12 1/4" hole from 13 3/8" shoe to 3151 m with 1.40 sg mud weight. At 3151 m, doubt arose whether an insufficient FIT had been taken on the 13 3/8" shoe. This was based on static MWD readings showing 1.43 sg and the mud weight in and out being reported to 1.40 sg. The hole was circulated clean and the BHA pulled into the 13 3/8" shoe. The FIT was then repeated to 1.49 sg (Static ECD measurement during the FIT was reported to maximum 1.508 sg).

Continued drilling to TD 3839 m (final TD 3842 m). ECD increased at times which required additional circulation to keep the ECD low. Also had some tight spots and stringers, where up to 20 T WOB was required. Had no losses nor hole instability issues. Pumped a 10 m3 nut plug pill as an attempt to break loose some sticky cuttings possibly being attached to the BHA. Background gas increased slightly to max 2.2 % at TD. However, no changes in gas values on connection or during 10-10-10 test, indicating well in overbalance while drilling. Ran booster pump at 2200 LPM at all times.

Typical drilling parameters: 3500 LPM, 250-300 bar, 60-130 RPM, 5 - 10 kNm, ECD 1,47 - 1,53 sg, up to 25 T WOB. Average ROP 14.6 m/hr

After tripping out from TD with 3 stands, hung up with 30 T overpull and 20 T drag downwards. Ran back to TD, circulated bottoms up and back-reamed up into the 13 3/8" shoe. Circulated bottoms up at shoe and ran back to bottom. No tight spots, but reamed and washed last 9 m to TD. Indications on the GR log could indicate that the last 0.5 m of drilled formation could be sand, so an additional 3 m of formation was drilled to ensure no sand around the shoe. No tight spots were seen when POOH.

First logging run attempt stopped at 2680 m, inside the 13 3/8" casing. The centralisers were packed with clay when pulled to surface. A wiper trip was made to TD, with no problems in open hole. Back-reamed inside the 13 3/8" casing from 3035 m to 2000 m to remove clay sticking onto the casing wall. Pulled out from 2000 m and re-run wireline logs without problems.

No wiper trip in open hole prior to running 9 5/8" liner.

BIT RUNS

The 12 1/4" section was drilled with a MX-T09DX insert bit from Hughes Christensen with IADC code 437.

DRILLING FLUID
Had foaming problems causing loss of signals from MWD.
The drilling fluid still did not seem to cater for sufficient clay inhibitiveness nor to prevent clay from sticking onto the casing wall.

CASING
Ran 73 joints of 9 5/8" liner at an average running speed of 7 joints/hr. The 36 m shoetrack was equipped with spiraglider centralisers on the bottom 5 joints (rotating liner hanger).

No tight spots were observed in open-hole. Tagged 2m fill at 3840 m, washed the liner to bottom and positioned the liner shoe at 3840 m. Dropped liner hanger setting ball and set liner hanger with 160 bar. Sat down 40 tons of the liner weight, took up weight and confirmed liner hanger activated.

MWD/BHA
Packed BHA with corepoint finder feature. The BHA responded well with up to 25 T WOB during the drilling of the section.

The pressure sensor in the MWD was sent for control when it returned onshore (based on the static pressure measurements). The results were within specifications, 0.25% accuracy in the range 0-20 000 psi.

CEMENTING
Pre-cementing circulation was performed without losses at flow rates up to 2500 LPM / 172 bar. Initiated rotation at 2500 LPM and started loosing returns. Stopped rotation and cut back flow rate to 500 LPM/ 69 bar with no losses. Was able to increase flow rate to 1600 LPM, but upon initiating rotation, returns decreased immediately. Prior to pumping the spacer, maximum loss-free rate was 1810 LPM without rotation.

Pumped 22 m3 1.45 sg spacer at 1460 LPM/ 92 bar. Lost 15.2 m3 out of 22 m3 pumped. Had 44.0 bar back-pressure after the pumps were shut down. Mixed and pumped 34 m3 1.90 sg tail cement at 640 LPM (ICP, 65 bar, FCP, 11 bar). Had no returns during pumping of cement.

Released dart and displaced cement with 1.40 sg drilling fluid at 2500 LPM, 15 RPM and 5-8 KNn. Had no indication of plug shear out. Pumped theoretical volume of 64.6 m3 + 756 L, plug did not bump and no back flow.
After having pumped 700 strokes, the drilling fluid caught up with the cement and full returns were achieved. Gained 20.5 m3 during the displacement. Activated TSP packer and circulated bottoms up prior to POOH.

MU 8 1/2" drilling BHA and drilled shoetrack, with hard cement all the way from the float collar. After cleaning out the rathole and drilling 3 m new formation, a successful LOT to 1.72 sg was taken. The LOT was taken with 1.41 sg drilling fluid.

After taking the LOT, the BHA was pulled into the 9 5/8" liner shoe and mud weight increased to 1.47 sg prior to drilling 8 1/2" section to the top of the reservoir.

5.8 NO 6302/6-1, 8 1/2" (25.08.2005 22:00)

START: 25.08.2005 22:00 3845 m MD
END : 23.09.2005 03:00 4230 m MD

DRILLING SUMMARY
Drilled 8 1/2" hole from 3845 m to 3903 m, with a drilling break at 3899 m. The well was shut-in with no pressure build-up and maximum gas at bottoms-up was 3.24 %. Circulated well until gas readings were 0.5 %. Worked last single three times to verify hole in good condition. Circulated bottoms up with maximum 1.4 % gas. Raised the mud weight from 1.47 sg to 1.49 sg. Based on the gas response, performed a 5 stands short trip and circulated bottoms up at 2500 LPM (2100 LPM on the booster line) to check correct mud weight before POOH. Read 15.8 % gas at bottoms up and got a sudden gain of 2.8 m3. Closed in well and circulated out the gas in the riser. No pressure in the well. However, pressure build up was identified short time after the well was shut in. Circulated well for a period of time and monitored pressure. Low gas values were seen during circulating. Volume bled off corresponded with the compression of the drilling fluid. At this point the mud weight was increased to 1.54 sg. Pumped out of hole to the top of 9 5/8" liner to reduce risk of swabbing. It is believed that the pressure build up after the well was shut in was predominantly caused by temperature expansion of the drilling fluid.

During the function test of the upper annular, a slight increase in the stand pipe and choke line pressure was seen. Left annular closed and monitored pressure. Due to bad weather conditions, the well was kept shut in for 12 hours. When the weather conditions were so that coring could commence, the shut in well pressure had increased to 20 bar. This pressure build up is caused by temperature expansion of the drilling fluid as the maximum gas level (circ over choke and through poor-boy degasser) when circulating bottoms up, was only 0.1%.

Prior to cutting the first core, the mud weight was increased to 1.56 sg. Cored first section from 3903 m to 3911 m and recovered 7.9 m core. The coring BHA was pumped out to above the 9 5/8" liner top. Ran a second coring run due to indications of sand in the bottom of the first core. The second coring run cut a new 7 m core from 3911 m to 3918 m, but recovered only 4.7 m.

Continue drilling from 3918 m to 3934 m, with a drilling break at 3930 m. Maximum gas 2.14 %. Drilled 2 m extra to confirm presence of sand. No gas peaks were identified on bottoms up after a 10-10-10 test.

The third core was cut from 3935.5 m to 3941.5 m where 3.1 m core was recovered. The core was jammed off in the inner barrel.

Observed 1 m3 gain when reaming cored section prior to continuing drilling. Flow checked well and observed another 300 L of gain. Shut in well with no further gain and no pressure

build-up. When opening the well to continue operations, observed another 600 L gain. The well was shut in and the riser circulated clean through the booster line with no indications of gas. Shut in choke line pressure built to 27 bar. Bled back 144 L until choke line pressure was 0 bar. It is believed that this pressure build up is due to thermal expansion of the drilling fluid (Mud IN temperature was approx. 13 deg C before the gain was observed. MWD temperature at this depth is around 35-37 deg C and BOP temperature sensor shows about 2 deg C).

Drilled 8 1/2" hole from 3941m to 3965 m, where a new 3.3 m3 gain was taken. Closed in well and circulated bottoms-up with maximum gas values at 1.08 % (after poor-boy). Drilled 8 1/2" hole to TD at 4230 m.

BIT RUNS
Drilled from 3845 m to 3903 m with a MX09DX insert bit from Hughes Christensen.
Typical parameters: 2500 LPM / 300 Bar, 150 RPM, 11T WOB, 8-10 kNm, max ECD 1,563 sg. Boosted riser continuously with 2100 LPM.

Coring:
1st coring run:
Cored 8 m in 10,5 hrs at 1000 LPM, 70-90 RPM and 3-8 ton WOB. Cored with HC606 core bit and 27 m barrel. Maximum gas value seen while coring were 0.66 %, 0.29 % on bottoms up after jamming off.

2nd coring run:
Second coring run employed the same HC606, 6-bladed core bit with 19 mm cutters and 27 m core barrel.
Cored from 3911-3918 m, with poor coring performance. Utilised up to 13 T WOB without significant increase in ROP. Low torque response throughout the coring could be an indication of the core bit being balled up.
Coring parameters: 1200 LPM, RPM 70-90 and WOB 5-13 T.
Core bit came out balled up with clay, with only one "water-way" free. 3 of 6 nozzles were plugged. There was also significant build-up of clay in the water-ways of the barrel stabilisers. Jam offs on two initial coring attempts were in the catcher. The coring jammed off when change of lithology.

2nd bit run:
Drilled from 3918 m to 3936 m using a Lyng 565 PDC bit. The bit only drilled 18 m to the next coring point (6m confirmed sand), with an average ROP of 5.5 m/hr. Low progress in the shale. Applied up to 14 T WOB without improving the ROP.

3rd coring run:
Same HC606 coring bit and 27 m barrel. Total ROP was 1.1 m/hr with very low progress in the shales.

3rd bit run:
Continued drilling from 3941.5 m to TD with the same BHA and LD565 PDC as in the 2nd bit run. Drilled from 3941m to 3996 m with an average ROP of 4.1 m/hour. Drilled very slowly in

shale with 9-20 T WOB and 90 -180 RPM. Considered to perform a bit trip and change out bit to a LD331AHG PDC bit (Lyng).This bit was believed to increase the slow ROP from 2 - 4 m/hour in the shales. The average ROP in shale was 2-3 m/hour and 6-8 m/hour in chalk. Decided to continue drilling with the LD565 until no noticeable progress was seen. ROP improved slightly after this. Indications of plugged nozzle after drill break at 4047 m. Cut back ~200 LPM on flow rate until nozzle unplugged itself.
8-12 T WOB and 150 RPM seemed to give the best ROP in the shale sections.

DRILLING FLUID
The cuttings over the shakers were almost fully dissolved in the mud. The innerbarrel in the coring assembly was fully covered with a thick layer of clay even though this has a very smooth surface. Non-mag drill collars have not been covered that much.

MWD/BHA
6 3/4" Ontrack MWD with near bit gamma ray and resistivity sensors.

5.9 NO 6302/6-1, PERM P&A (23.09.2005 03:00)

START: 23.09.2005 03:00 4230 m MD
END : 07.10.2005 07:00 4230 m MD

SUMMARY
Plug #1: RIH with diverting tool, 11 stands of 3 1/2" stinger, 28 stands of 5" dp and rest 5 1/2" dp. Circulated sample depth at 3937 m against closed BOP and up choke line. Sat balanced cement plug from 4230 m to 3950 m. Pulled out of hole to 3940 m and circulated bottoms up prior to placing the second OH cement plug. Had 42 m3 of mud contaminated with cement in returns.

Plug#2: Sat balanced cement plug from 3940 m to 3680 m. Pulled out of hole at 3 min/stand to approx. 3660 m (20 m above estimated TOC at 3680m). Washed setting depth for 9 5/8" EZSV at approx. 3400 m on the way out and POOH. Made up 9 5/8" EZSV dressed as a bridge plug and RIH to 1285 m on 5" and 3 1/2" DP. Pressure tested cement plug to 70 bar above LOT at 9 5/8" shoe.

Continue RIH with 9 5/8" EZSV at 1 min per stand slips to slips (3 min inside 9 5/8" liner) and installed the 9 5/8" EZSV at 3398`m (spaced out between connections according to 9 5/8" casing tally). Sheared out EZSV at 141 tons. Pressure tested EZSV and 9 5/8" liner top packer to 70 bar above LOT at 9 5/8" liner shoe. Placed balanced cement plugs #3 and #4 on top of the EZSV from 3398 m to 3150 m and from 3140 m to 2890 m, i.e. 78 m cement above the top of 9 5/8" liner.

Displaced kill/choke and booster lines to 1.37 sg mud. Displaced hole from 1.56 sg mud to 1.37 sg mud.

RIH with 13 3/8" cutting assembly on 5 1/2" DP with marine and annular swivel and cut 13 3/8" casing at 2069 m. The 13 3/8" casing was cut against closed BOP and return up both kill

and choke line to reduce ECD at 16" liner shoe while cutting. Operational parameters during cutting were 614-675 LPM, 120-150 RPM and 6 -9 kNm. Positive indication of cut. POOH with the 13 3/8" casing cutting assembly.

Retrieved 13 3/8" wear bushing with 23 T overpull. RIH with 13 3/8" spear assembly and engaged spear with 15 T overpull. Pulled up 3 m to verify free casing. No overpull. Flow checked well static. Retrieved 13 3/8" casing to surface.

Made up and RIH with 16" EZSV dressed as a retainer on 5 1/2" DP and installed EZSV at 2050 m with 15 T overpull. Load tested plug with 10 T. Pressure tested plug to 94 bar. Sat balanced cement plug #5 from 2050 m to 1780 m and displaced well to seawater. Placed a 220 m 1.03 sg hi-vis pill from 1770 m to 1550 m as base for balanced cement plug #6. Balanced cement plug # 6 was set from 1550 m to 1320 m.

Due to no visible water flow on 6302/6-U-1 nor in the vicinity of the wellhead, decision was made to pull BOP and riser on 6302/6-1.

After cutting the wellhead on 6302/6-U-1, moved rig back to 6302/6-1. Changed cutters and function tested MOST tool. RIH with 20" x 36" cutting assembly and cut 20" x 36" casing while circulating seawater at 2880 - 3396 LPM, 102-138 Bar. Increased from 15 to 30 ton overpull while cutting since this wellhead was not equipped with a rubber sleeve housing. Clean cut after 5 hours cutting and retrieved cut wellhead to surface.
Observed channel in cement between the 20" and 36" casing when inspecting wellhead on surface. Retrieved dropped objects on the seabed and performed final ROV survey.

5.10 NO 6302/6-U-1, PERM P&A (03.10.2005 22:00)

START: 03.10.2005 22:00 2122 m MD
END : 05.10.2005 11:30 2122 m MD

SUMMARY
Due to no visible water flow on 6302/6-U-1 nor in the vicinity of the wellhead, decision was made to pull BOP and riser on 6302/6-1 and place a balanced cement plug on top of the float collar inside the 20" casing (6302/6-U-1), before commencing planned cutting programmes on the two wells.

Moved rig to 6302/6-U-1 and RIH with 5 1/2" DP and diverting tool. Tagged cement at 2084 m, 6 m above float collar. Circulated BU and set balanced cement plug #1 from 2084 m to 1884 m. Pumped and displaced a 326 m 1.03 sg hi-vis pill from 1876 m to 1550 m and sat balanced cement plug #2 from 1550 m to 1346 m.

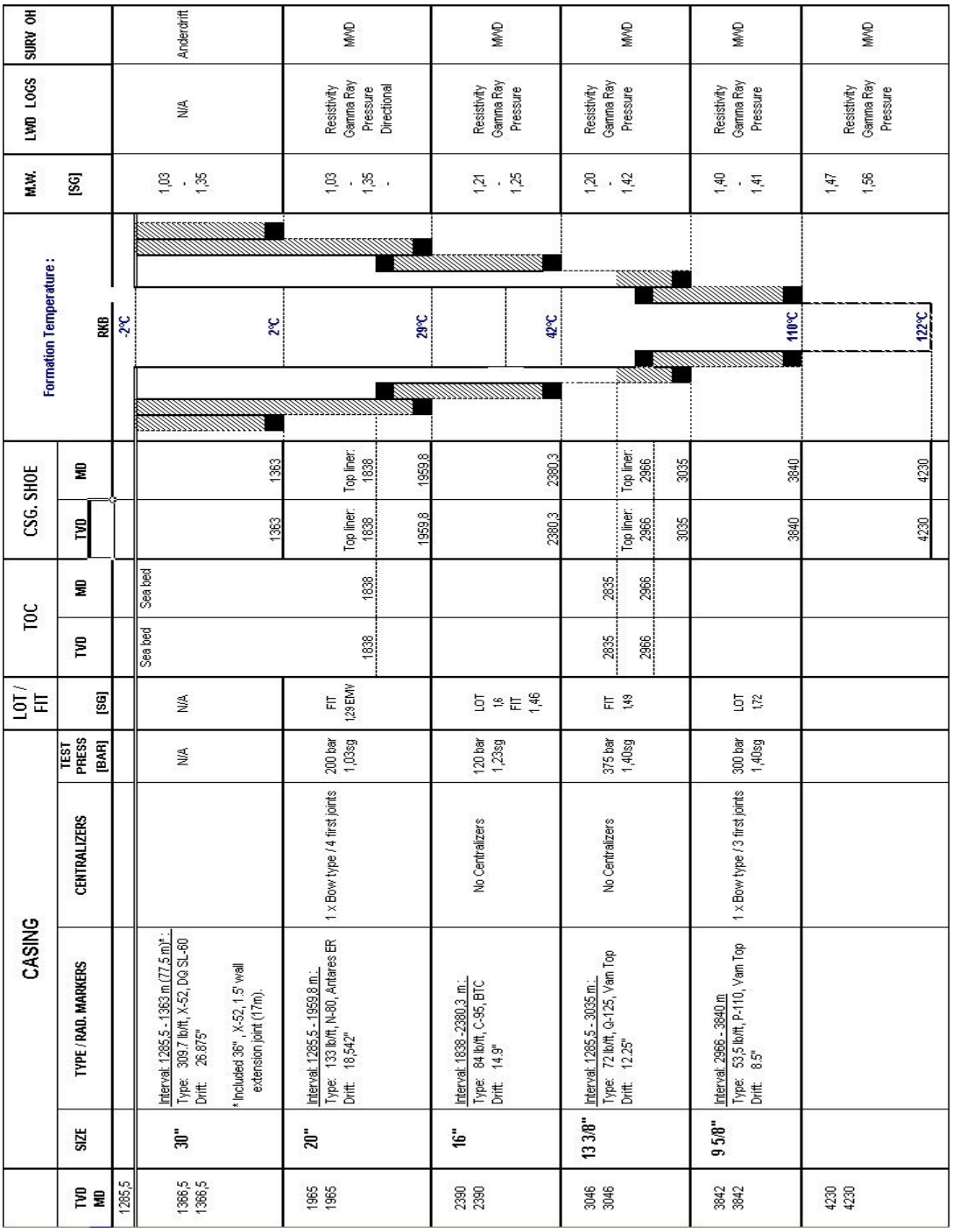
Made up MOST tool and 20" x 36" cutting assembly and stabbed into wellhead assisted by ROV. Cut 20" x 36" casing with the following operational parameters: 2800 - 3400 LPM, 109-151 bar. Clean cut after 2 hours cutting. Recorded 5 T overpull to pull free. Retrieved cut

wellhead to 350 m. No cement between 20" casing and 36" wellhead housing when inspected at surface.

5.11 Figures and tables

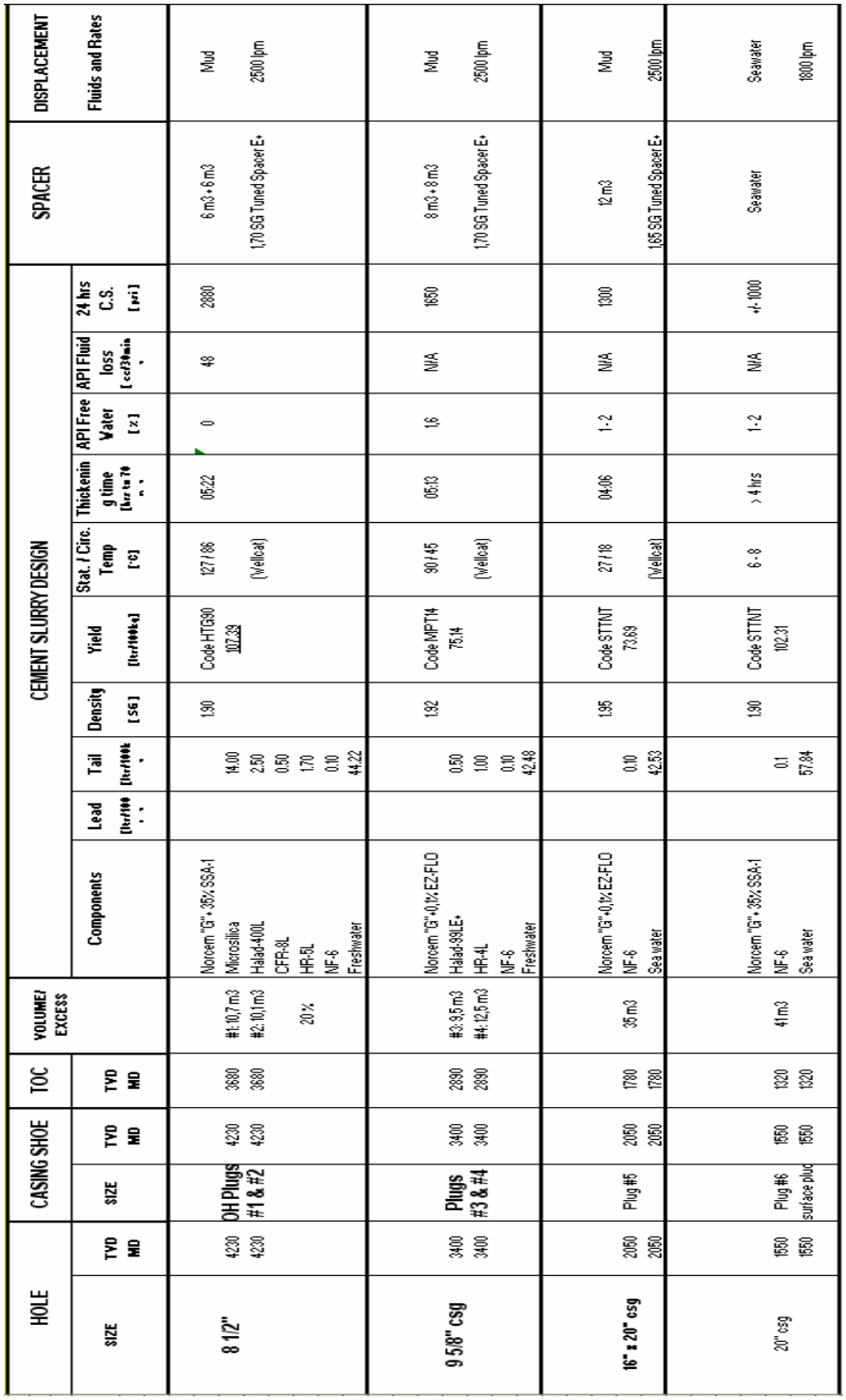
5.11.1 Well schematic

Figure 5.1 Well Schematic


CASING
TVD
MD
SIZE
TYPE / RAD. MARKERS
CENTRALIZERS
TEST PRESS [BAR]
LOT / FIT [SG]
TOC TVD
TOC MD
CSG. SHOE TVD
CSG. SHOE MD
Formation Temperature :
RKB
-2°C
2°C
20°C
42°C
110°C
122°C
M.W. [SG]
LWD LOGS
SURV OH
1285,5
1366,5
1366,5
30"
Interval: 1285,5 - 1363 m (77,5 m)* :
Type: 309,7 lb/ft, X-52, DQ SL-60
Drift: 26.875"
* Included 36" , X-52, 1.5' wall extension joint (17m).
N/A
Sea bed
Sea bed
1363
1363
1,03 - 1,35
N/A
Anderdrift
1965
1965
20"
Interval: 1285,5 - 1959,8 m :
Type: 133 lb/ft, N-80, Antares ER
Drift: 18,542"
1 x Bow type / 4 first joints
200 bar 1,03sg
FIT 1,29 EMW
1838
1838
Top liner: 1838
Top liner: 1838
1959,8
1959,8
1,03 - 1,35 - -
Resistivity Gamma Ray Pressure Directional
MWD
2390
2390
16"
Interval: 1838 -2380,3 m :
Type: 84 lb/ft, C-95, BTC
Drift: 14.9"
No Centralizers
120 bar 1,23sg
LOT 1,6 FIT 1,46
2380,3
2380,3
1,21 - 1,25
Resistivity Gamma Ray Pressure
MWD
3046
3046
13 3/8"
Interval: 1285,5 - 3035 m :
Type: 72 lb/ft, Q-125, Vam Top
Drift: 12.25"
No Centralizers
375 bar 1,40sg
FIT 1,49
2835
2966
2835
2966
Top liner: 2966
Top liner: 2966
3035
3035
1,20 - 1,42
Resistivity Gamma Ray Pressure
MWD
3842
3842
9 5/8"
Interval: 2966 - 3840 m
Type: 53,5 lb/ft, P-110, Vam Top
Drift: 8.5"
1 x Bow type / 3 first joints
300 bar 1,40sg
LOT 1,72
3840
3840
1,40 - 1,41
Resistivity Gamma Ray Pressure
MWD
4230
4230
4230
4230
1,47 - 1,56
Resistivity Gamma Ray Pressure
MWD

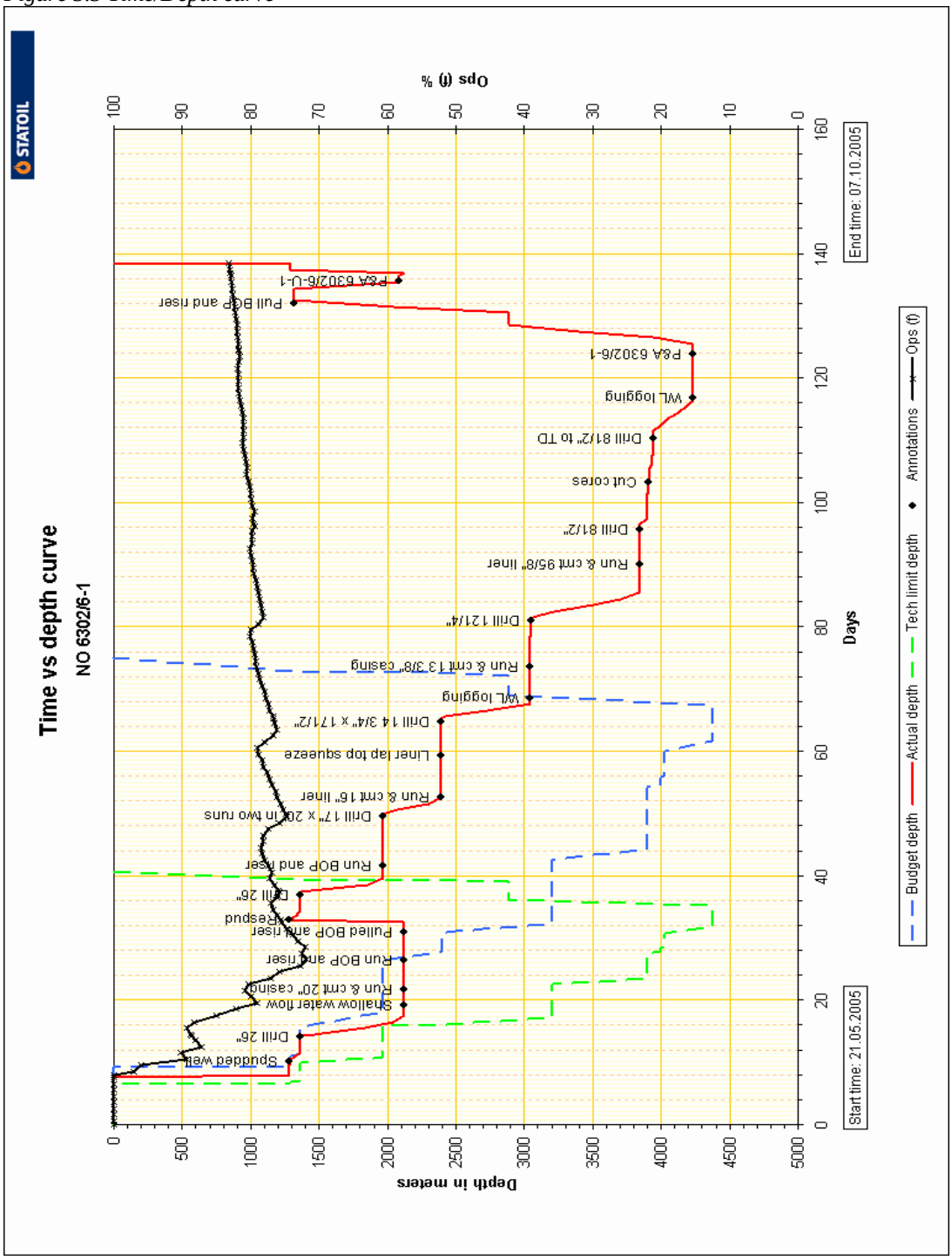
5.11.2 P&A wellbore schematic

Figure 5.2 P&A Schematic



5.11.3 Time/depth curve

Figure 5.3 Time/Depth curve



5.11.4 Timeplanner

Table 5.1 Timeplanner
PROJECT NAME: Tulipan (O251A)
PROJECT NUMBER: T.O251A.AP.20100

Start time	End time	Budget time hrs	Acc budget days	Tech limit hrs	Acc tech days	Plan time hrs	Act time hrs	Acc actual days	Down time	Description	Companies
21.05.2005 17:00	29.05.2005 16:30	224.8	9.4	162.0	6.8	192.0	191.5	8.0	0.0	MOBILIZ [NO 6302/6-U-1]	
21.05.2005 17:00	24.05.2005 12:30	93.7	3.9	73.0	3.0	73.0	67.5	2.8	0.0	2 Move rig from 69deg north location to KSU location.	OR,BHI
24.05.2005 12:30	27.05.2005 17:30	74.9	7.0	53.0	5.3	77.0	77.0	6.0	0.0	3 Load riser/casing onboard	OR
27.05.2005 17:30	28.05.2005 22:30	28.1	8.2	24.0	6.3	30.0	29.0	7.2	0.0	4 Move rig from KSU to Tulipan	OR
28.05.2005 22:30	29.05.2005 16:30	28.1	9.4	12.0	6.8	12.0	18.0	8.0	0.0	5 Set out transponders. Perform DP test. Ballast rig to drilling draft.	OR,Ocean
29.05.2005 16:30	01.06.2005 01:00	0.0	9.4	0.0	6.8	4.0	56.5	10.3	27.0	6 Run 36" BHA down to sea bed.	OR,BHI,Ocean
29.05.2005 16:30	05.06.2005 00:30	23,4	1,0	0,0	0,0	91,5	152,0	6,3	39,0	42" x 36" [NO 6302/6-U-1]	
01.06.2005 00:59	01.06.2005 01:00	10.5	9.8	0.0	6.8	1.0	0.0	10.3	0.0	7 PU 1300 m 5" Landing string	OR
01.06.2005 00:59	01.06.2005 01:00	12.9	10.3	0.0	6.8	18.0	0.0	10.3	0.0	8 PU 1500m 5 1/2" DP	OR
01.06.2005 00:59	01.06.2005 01:00	0.0	10.3	0.0	6.8	1.0	0.0	10.3	0.0	9 MU 30" running tool & cment stand. R/B	OR,Hall,DQ
01.06.2005 00:59	01.06.2005 01:00	0.0	10.3	0.0	6.8	1.0	0.0	10.3	0.0	10 MU 36" x 42" BHA	OR,BHI
01.06.2005 01:00	01.06.2005 15:00	0.0	10.3	0.0	6.8	13.5	14.0	10.9	0.0	11 Drill 36" hole fram 1287 m to 1360 m. (ROP: x m/hr)	MI,OR,Geo,BHI,Ocean
01.06.2005 15:00	01.06.2005 15:30	0.0	10.3	0.0	6.8	3.0	0.5	10.9	0.0	12 Circulate hole clean and displace to 1.35 sg mud.	MI,OR,Geo,BHI,Ocean
01.06.2005 15:30	01.06.2005 19:30	0.0	10.3	0.0	6.8	6.0	4.0	11.1	0.0	13 POOH, top up hole with 1,35 sg mud from below sea bed.	MI,OR,Geo,BHI,Ocean
01.06.2005 19:30	02.06.2005 01:00	0.0	10.3	0.0	6.8	2.0	5.5	11.3	0.0	14 L/D 36" *42" BHA.	OR,BHI
02.06.2005 01:00	02.06.2005 06:00	0.0	10.3	0.0	6.8	2.0	5.0	11.5	0.0	15 Rig up and run 30*36" conductor .	OR,Geo,Ocean,Weath,DQ
02.06.2005 06:00	02.06.2005 09:30	0.0	10.3	0.0	6.8	2.0	3.5	11.7	0.0	16 Install c plate. MU stinger and R/T. Install bullseyes.	OR,Geo,Ocean,DQ
02.06.2005 09:30	02.06.2005 11:00	0.0	10.3	0.0	6.8	1.0	1.5	11.8	0.0	17 Remove condcutor handling eq. RU for landingstring	OR,Geo,Ocean,DQ
02.06.2005 11:00	02.06.2005 15:00	0,0	10,3	0,0	6,8	4,0	4,0	11,9	0,0	18 RIH w/ 36"x 30" conductor	OR,Geo,Ocean
02.06.2005 15:00	02.06.2005 16:30	0.0	10.3	0.0	6.8	3.0	1.5	12.0	0.0	19 Stab in and land conductor. Verify 3 m stick up. Install cmnt stand	OR,Geo,Ocean,DQ
02.06.2005 16:30	03.06.2005 05:00	0.0	10.3	0.0	6.8	3.0	12.5	12.5	10.5	20 Circulate, pump and displace Tuned-light cement.	OR,Hall,Geo,Ocean
03.06.2005 05:00	03.06.2005 07:30	0.0	10.3	0.0	6.8	3.0	2.5	12.6	1.0	21 Pump and displace G-cement. option B	OR
03.06.2005 07:30	03.06.2005 19:30	0.0	10.3	0.0	6.8	8.0	12.0	13.1	0.0	22 If required; WOC.	OR,Ocean

Start time	End time	Budget time hrs	Acc budget days	Tech limit hrs	Acc tech days	Plan time hrs	Act time hrs	Acc actual days	Down time	Description	Companies
03.06.2005 19:30	03.06.2005 21:00	0.0	10.3	0.0	6.8	4.0	1.5	13.2	0.0	23 Release RT and wash conductor housing.	OR,Ocean,DQ
03.06.2005 20:59	03.06.2005 21:00	0.0	10.3	0.0	6.8	0.0	0.0	13.2	0.0	24 Clear and clean rig floor	OR
03.06.2005 20:59	03.06.2005 21:00	0.0	10.3	0.0	6.8	0.0	0.0	13.2	0.0	25 Rig maintenance	OR
03.06.2005 21:00	04.06.2005 02:00	0.0	10.3	0.0	6.8	4.0	5.0	13.4	0.5	26 Grout 30" conductor. POOH. LD running tool and stinger	OR
04.06.2005 02:00	04.06.2005 05:30	0.0	10.3	0.0	6.8	6.0	3.5	13.5	0.0	27 MU 26" assembly.	OR,Geo,BHI,Ocean
04.06.2005 05:30	04.06.2005 09:00	0.0	10.3	0.0	6.8	0.0	3.5	13.7	0.0	28 MU cementhead stand and PU 20" Hanger stand and rack.	OR,Hall,DQ
04.06.2005 09:00	05.06.2005 00:30	0.0	10.3	0.0	6.8	2.0	15.5	14.3	0.0	29 Drill out 30" conductor shoe and clean out rat hole.	MI,OR,Geo,BHI,Ocean
05.06.2005 00:30	23.06.2005 14:30	0.0	0.0	0.0	0.0	253.0	447.0	18.6	153.5	26" [NO 6302/6-U-1]	
05.06.2005 00:30	07.06.2005 13:30	0.0	10.3	0.0	6.8	26.0	61.0	16.9	8.0	30 Drill 26" hole to 2200 m.	MI,OR,Geo,BHI,Ocean
07.06.2005 13:30	08.06.2005 06:30	0.0	10.3	0.0	6.8	1.0	17.0	17.6	16.0	31 Prepare and pump 1,35 sg kill mud . Observe well.	OR
08.06.2005 06:30	09.06.2005 07:00	0.0	10.3	0.0	6.8	0.0	24.5	18.6	17.5	32 POOH. RIH with open ended 5 1/2" DP Mix 1,45 sg kill mud	MI,OR,Geo,BHI,Ocean
09.06.2005 07:00	09.06.2005 17:00	0.0	10.3	0.0	6.8	12.0	10.0	19.0	10.0	33 Mix 1,45 sg kill mud	OR
09.06.2005 17:00	09.06.2005 21:00	0.0	10.3	0.0	6.8	4.0	4.0	19.2	2.0	34 Pump 1,45 sg kill mud.	MI,OR,Geo,BHI,Ocean
09.06.2005 21:00	10.06.2005 03:00	0.0	10.3	0.0	6.8	5.0	6.0	19.4	6.0	35 POOH with open ended 5 1/2" DP.	MI,OR,Geo,BHI,Ocean
10.06.2005 03:00	10.06.2005 18:00	0.0	10.3	0.0	6.8	14.0	15.0	20.0	0.0	36 MU and RIH with 26" wiper trip assembly, and clean well.	MI,OR,Geo,BHI,Ocean
10.06.2005 18:00	11.06.2005 05:00	0.0	10.3	0.0	6.8	6.0	11.0	20.5	0.0	37 POOH and rack 26" BHA	OR,Geo,BHI
11.06.2005 05:00	11.06.2005 12:30	0.0	10.3	0.0	6.8	4.0	7.5	20.8	0.0	38 RU to run 20" casing. Check correct adapter profile for 16" hanger	OR,Weath,DQ
11.06.2005 12:30	12.06.2005 07:00	0.0	10.3	0.0	6.8	21.0	18.5	21.6	0.0	39 Run 20" casing. Fill casing with seawater.	OR,Geo,Ocean,Weath
12.06.2005 07:00	12.06.2005 12:30	0.0	10.3	0.0	6.8	5.0	5.5	21.8	0.0	40 RU for 5" landingstring. Run to seabed.	OR,Geo,Ocean,Weath,DQ
12.06.2005 12:30	12.06.2005 14:30	0.0	10.3	0.0	6.8	1.0	2.0	21.9	0.0	41 Displace 20" casing to 1.45 SG weighted mud.	MI,OR,Geo,Ocean
12.06.2005 14:30	12.06.2005 21:00	0.0	10.3	0.0	6.8	4.0	6.5	22.2	0.0	42 Enter well and RIH to TD. Top up casing with 1,45 sg mud.	OR,Geo,Ocean
12.06.2005 21:00	17.06.2005 01:00	0.0	10.3	0.0	6.8	34.0	100.0	26.3	81.0	43 Circulate, pump and displace cement	OR,Hall,Geo,Ocean
17.06.2005 01:00	17.06.2005 01:30	0.0	10.3	0.0	6.8	1.0	0.5	26.4	0.0	44 Check float. Do not pressure test. Float will fail.	OR,Hall,Geo,Ocean
17.06.2005 01:30	17.06.2005 02:30	0.0	10.3	0.0	6.8	2.0	1.0	26.4	0.0	45 Rack cement stand. Apply rigid lock down. Release R/T and wash WH area.	OR,Geo,Ocean,DQ
17.06.2005 02:30	17.06.2005 07:30	0.0	10.3	0.0	6.8	4.0	5.0	26.6	0.0	46 POOH. L/D cement head and R/T	OR,Hall,Geo,Ocean,DQ
17.06.2005 07:30	17.06.2005 17:30	0.0	10.3	0.0	6.8	20.0	10.0	27.0	0.0	47 Prepare to run BOP	OR
17.06.2005 09:00	17.06.2005 10:00	0.0	10.3	0.0	6.8	2.0	1.0	27.1	0.0	48 L/D 26" BHA	OR,BHI
17.06.2005 17:30	21.06.2005 17:30	0.0	10.3	0.0	6.8	36.0	96.0	31.1	11.5	49 Run BOP/riser	OR,Hall,Ocean

Start time	End time	Budget time hrs	Acc budget days	Tech limit hrs	Acc tech days	Plan time hrs	Act time hrs	Acc actual days	Down time	Description	Companies
21.06.2005 17:30	23.06.2005 05:30	0.0	10.3	0.0	6.8	44.0	36.0	32.6	1.5	50 Decided to respud. Pulled riser/BOP	OR,Hall,Ocean
23.06.2005 05:30	23.06.2005 14:30	0.0	10.3	0.0	6.8	7.0	9.0	32.9	0.0	51 Rig down riser running gear. Clear the drill floor.	MI,OR,Hall,Geo,Weir
23.06.2005 14:30	28.06.2005 02:00	128.7	5.4	75.2	3.1	72.5	118.5	4.9	23.5	42" x 36" [NO 6302/6-1]	
23.06.2005 14:30	23.06.2005 16:00	4.7	10.5	0.0	6.8	1.0	1.5	33.0	0.0	52 MU 30" running tool & cment stand. R/B	OR,Hall,DQ
23.06.2005 16:00	23.06.2005 21:00	7.0	10.8	0.0	6.8	1.0	5.0	33.2	0.0	53 MU 36" x 42" BHA	OR,Hall,BHI
23.06.2005 21:00	24.06.2005 03:30	5.3	11.0	3.5	6.9	4.0	6.5	33.5	0.0	54 Run 36" BHA down to sea bed.	OR,Hall,BHI
24.06.2005 03:30	24.06.2005 12:00	8.5	11.4	5.7	7.1	13.5	8.5	33.8	0.0	55 Drill 36" hole from 1287 m to 1360 m. (ROP: x m/hr)	MI,OR,Hall,Geo,BHI,Ocean
24.06.2005 12:00	24.06.2005 12:30	10.5	11.8	3.5	7.3	3.0	0.5	33.9	0.0	56 Circulate hole clean and displace to 1.35 sg mud.	MI,OR,Hall,Geo,BHI,Ocean
24.06.2005 12:30	24.06.2005 16:00	3.3	12.0	2.9	7.4	6.0	3.5	34.0	0.0	57 POOH, top up hole with 1,35 sg mud from below sea bed.	MI,OR,Hall,Geo,BHI,Ocean
24.06.2005 16:00	24.06.2005 19:00	4.7	12.2	2.9	7.5	2.0	3.0	34.1	0.0	58 L/D 36"x42" BHA.	OR,Hall,BHI
24.06.2005 19:00	24.06.2005 22:30	8.2	12.5	4.6	7.7	2.0	3.5	34.3	0.0	59 Rig up and run 30*36" conductor .	OR,Hall,Geo,Ocean,Weath, DQ
24.06.2005 22:30	25.06.2005 02:00	11.7	13.0	6.4	8.0	2.0	3.5	34.4	0.0	60 Install c plate. MU stinger and R/T. Install bullseyes.	OR,Hall,Geo,Ocean,DQ
25.06.2005 01:59	25.06.2005 02:00	4.7	13.2	2.9	8.1	1.0	0.0	34.4	0.0	61 Remove condcutor handling eq. RU for landingstring	OR,Hall,Geo,Ocean,DQ
25.06.2005 02:00	25.06.2005 05:00	4.7	13.4	3.5	8.2	4.0	3.0	34.5	0.0	62 RIH w/ 36"x 30" conductor	OR,Hall,Geo,Ocean
25.06.2005 05:00	25.06.2005 08:00	10.5	13.8	6.4	8.5	3.0	3.0	34.7	0.0	63 Stab in and land conductor. Verify 3 m stick up. Install cmnt stand	OR,Hall,Geo,Ocean,DQ
25.06.2005 08:00	25.06.2005 11:00	3.5	14.0	2.3	8.6	3.0	3.0	34.8	0.0	64 Circulate, pump and displace G-Cement.	OR,Hall,Geo,Ocean
25.06.2005 11:00	25.06.2005 23:00	9.4	14.4	9.4	9.0	8.0	12.0	35.3	0.0	65 WOC.	OR,Hall,Ocean
25.06.2005 23:00	26.06.2005 01:00	6.6	14.6	4.7	9.2	4.0	2.0	35.4	0.0	66 Release RT and wash conductor housing.	OR,Hall,Ocean,DQ
26.06.2005 00:59	26.06.2005 01:00	2.3	14.7	1.2	9.2	0.0	0.0	35.4	0.0	67 Clear and clean rig floor	OR,Hall
26.06.2005 00:59	26.06.2005 01:00	2.3	14.8	0.0	9.2	0.0	0.0	35.4	0.0	68 Rig maintenance	OR,Hall
26.06.2005 01:00	27.06.2005 08:30	0.0	14.8	0.0	9.2	4.0	31.5	36.7	20.0	69 Grout 30" conductor. POOH. LD running tool and stinger	OR,Hall,Ocean,DQ
27.06.2005 08:30	27.06.2005 20:00	2.3	14.9	1.8	9.3	2.0	11.5	37.2	3.5	70 MU cementhead stand and PU 20" Hanger stand and rack.	OR,Hall
27.06.2005 09:00	27.06.2005 21:30	11.5	15.4	10.0	9.7	7.0	12.5	37.7	0.0	71 MU and RIH with 26" assembly.	OR,Hall,Geo,BHI,Ocean
27.06.2005 21:30	28.06.2005 02:00	7.0	15.7	3.5	9.9	2.0	4.5	37.9	0.0	72 Drill out 30" conductor shoe and clean out rat hole.	MI,OR,Hall,Geo,BHI,Ocean
28.06.2005 02:00	29.06.2005 14:30	55.7	18.0	24.6	10.9	30.0	36.5	39.4	0.0	73 Drill 26" hole to 1960 m.	MI,OR,Geo,BHI,Ocean
28.06.2005 02:00	10.07.2005 16:30	256.1	10.7	149.7	6.2	213.0	302.5	12.6	84.0	26" [NO 6302/6-1]	
29.06.2005 14:29	29.06.2005 14:30	4.7	18.2	3.5	11.1	0.0	0.0	39.4	0.0	74 L/D 26" BHA	OR
29.06.2005 14:29	29.06.2005 14:30	3.5	18.4	1.2	11.1	1.0	0.0	39.4	0.0	75 Planned rig maintenance	OR
29.06.2005 14:29	29.06.2005 14:30	7.0	18.7	2.3	11.2	0.0	0.0	39.4	0.0	76 MU and rack cement head and hanger for 16" liner & 13 3/8" casing	OR,Hall,DQ

Start time	End time	Budget time hrs	Acc budget days	Tech limit hrs	Acc tech days	Plan time hrs	Act time hrs	Acc actual days	Down time	Description	Companies
29.06.2005 14:29	29.06.2005 14:30	2.3	18.8	1.2	11.2	1.0	0.0	39.4	0.0	77 Clear and clean rig floor	OR
29.06.2005 14:30	29.06.2005 18:00	29.4	20.0	21.1	12.1	4.0	3.5	39.5	0.0	78 Circulate hole clean and displace to 1.35 SG mud	OR
29.06.2005 18:00	30.06.2005 02:30	10.8	20.4	6.0	12.4	6.0	8.5	39.9	0.0	79 POOH and rack 26" BHA	OR,Geo,BHI
30.06.2005 02:30	30.06.2005 06:30	4.7	20.6	2.3	12.5	4.0	4.0	40.1	0.0	80 RU to run 20" casing. Check correct adapter profile for 16" hanger	OR,Weath,DQ
30.06.2005 06:30	01.07.2005 09:30	13.3	21.2	8.9	12.8	16.0	27.0	41.2	8.5	81 Run 20" casing. Fill casing with seawater.	OR,Geo,Ocean,Weath
01.07.2005 09:30	01.07.2005 12:00	5.6	21.4	3.0	13.0	5.0	2.5	41.3	0.0	82 RU for 5" landingstring. Run to seabed.	OR,Geo,Ocean,Weath,DQ
01.07.2005 12:00	01.07.2005 13:00	3.5	21.6	1.2	13.0	1.0	1.0	41.3	0.0	83 Displace 20" casing to 1.35 SG weighted mud.	MI,OR,Geo,Ocean
01.07.2005 13:00	01.07.2005 17:30	3.5	21.7	2.3	13.1	4.0	4.5	41.5	0.0	84 Enter well and RIH to TD. Top up casing with 1,35 sg mud.	OR,Geo,Ocean
01.07.2005 17:30	02.07.2005 01:30	14.0	22.3	11.7	13.6	12.0	8.0	41.9	1.0	85 Circulate mud, mix and displace cement	OR,Hall,Geo,Ocean
02.07.2005 01:30	02.07.2005 02:00	1.8	22.4	1.2	13.7	1.0	0.5	41.9	0.0	86 Check float. Do not pressure test. Float will fail.	OR,Hall,Geo,Ocean
02.07.2005 02:00	02.07.2005 03:00	3.5	22.5	1.8	13.7	2.0	1.0	41.9	0.0	87 Rack cement stand. Apply rigid lock down. Release R/T and wash WH area.	OR,Geo,Ocean,DQ
02.07.2005 03:00	02.07.2005 06:30	6.6	22.8	2.7	13.8	4.0	3.5	42.1	0.0	88 POOH. L/D cement head and R/T	OR,Hall,Geo,Ocean,DQ
02.07.2005 06:30	02.07.2005 16:30	17.6	23.5	7.0	14.1	20.0	10.0	42.5	0.0	89 Prepare to run BOP	OR
02.07.2005 16:30	04.07.2005 15:30	21.5	24.4	16.7	14.8	36.0	47.0	44.4	4.0	90 Run BOP/riser	OR,Hall,Ocean
04.07.2005 15:30	05.07.2005 09:00	23.4	25.4	17.6	15.6	12.0	17.5	45.2	0.0	91 Land BOP and pressure test. Post-landing activities.	OR,Hall,Ocean
05.07.2005 09:00	05.07.2005 09:30	0.0	25.4	0.0	15.6	0.0	0.5	45.2	0.0	92 PU cement head and broke 5" DP joint.	OR,Hall,Geo,Ocean,DQ
05.07.2005 09:30	06.07.2005 16:30	12.6	25.9	6.3	15.8	6.0	31.0	46.5	13.0	93 MU and RIH with 17" BHA	OR,Geo,BHI,BHI,Weir
06.07.2005 16:30	07.07.2005 04:00	7.6	26.2	5.9	16.1	4.0	11.5	47.0	0.0	94 Hold kick drill. Drill out shoetrack w/sw and pills. Drill 3m new formation	MI,OR,Geo,BHI,BHI,Weir
07.07.2005 04:00	08.07.2005 09:00	3.5	26.4	1.2	16.1	3.0	29.0	48.2	17.0	95 Circulate and perform LOT.	MI,OR,Hall,Geo,Weir
08.07.2005 09:00	10.07.2005 01:30	0.0	26.4	0.0	16.1	32.0	40.5	49.9	40.5	96 B Squeeze cementing 20" shoe	MI,OR,Hall,Geo,Weir
10.07.2005 01:29	10.07.2005 01:30	0.0	26.4	0.0	16.1	0.0	0.0	49.9	0.0	97 Displace well to 1,23sg Glydril DW mud.	OR
10.07.2005 01:30	10.07.2005 16:30	0.0	26.4		16.1	9.0	15.0	50.5	0.0	98 C Circ. cond. mud and hole Perform FIT	MI,OR,Hall,Geo,Weir
10.07.2005 16:30	25.07.2005 23:00	108.2	4.5	0.0	0.0	252.0	374.0	15.6	64.5	17"X20" [NO 6302/6-1]	
10.07.2005 16:30	13.07.2005 18:00	35.0	27.8	0.0	16.1	70.0	73.5	53.5	1.5	99 Drill 17" hole, circulate BU and POOH	MI,OR,Geo,BHI,Weir
13.07.2005 18:00	17.07.2005 02:30	0.0	27.8	0.0	16.1	48.0	80.5	56.9	1.5	100 M/U UR assy, UR 20" hole. Ream tight hole. POOH	MI,OR,Geo,BHI,Weir
17.07.2005 02:30	19.07.2005 03:30	24.0	28.8	0.0	16.1	30.0	49.0	58.9	0.0	101 Pull wear bushing. Run 16" liner.	OR,Geo,Weath,DQ
19.07.2005 03:30	19.07.2005 14:30	24.8	29.9	0.0	16.1	20.0	11.0	59.4	0.0	102 Cement 16" liner. POOH and LD liner running string	MI,OR,Hall,Geo,DQ,Weir
19.07.2005 14:30	20.07.2005 10:00	0.0	29.9	0.0	16.1	10.0	19.5	60.2	0.0	103 Run BOP test tool. Test BOP, POOH and LD test tool	OR
20.07.2005 10:00	20.07.2005 17:00	0.0	29.9	0.0	16.1	6.0	7.0	60.5	0.0	104 Run and set bore protector	MI,OR,Hall,Geo,DQ,Weir
20.07.2005 17:00	21.07.2005 06:00	0.0	29.9	0.0	16.1	8.0	13.0	61.0	0.0	105 RIH with Mill & Flush tool. Clean 16" liner seal area. POOH.	MI,OR,Hall,Geo,DQ,Weir

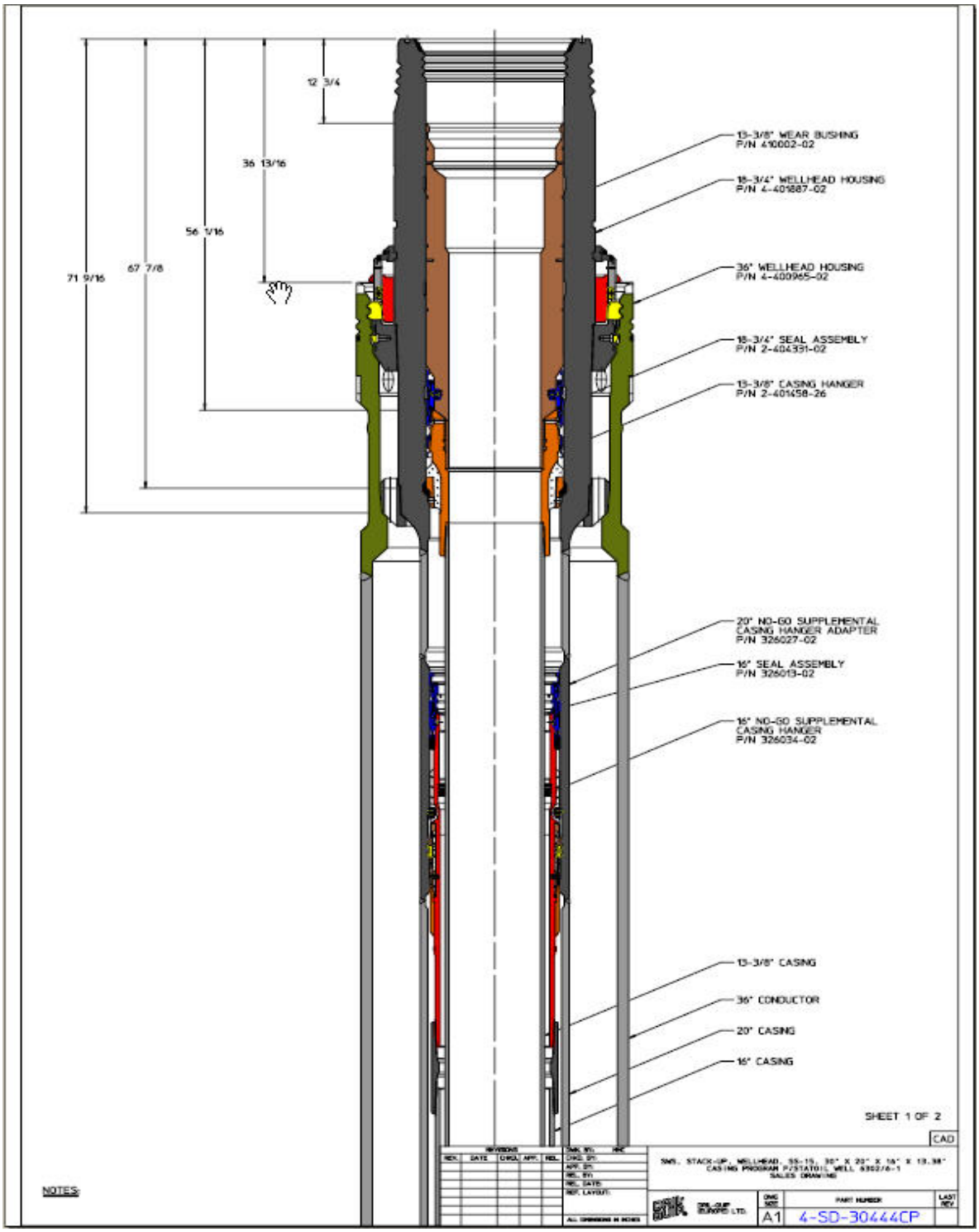
Start time	End time	Budget time hrs	Acc budget days	Tech limit hrs	Acc tech days	Plan time hrs	Act time hrs	Acc actual days	Down time	Description	Companies
21.07.2005 06:00	22.07.2005 12:00	0.0	29.9	0.0	16.1	15.0	30.0	62.3	27.0	106 RIH and squeeze cement into 16" liner lap. POOH.	MI,OR,Hall,Geo,DQ,Weir
22.07.2005 04:30	23.07.2005 20:00	0.0	29.9	0.0	16.1	15.0	39.5	63.9	33.5	107 Clean-out trip to top 16" liner with 17 1/2" bit.	MI,OR,Hall,Geo,DQ,Weir
23.07.2005 20:00	24.07.2005 03:00	7.0	30.2	0.0	16.1	10.0	7.0	64.2	1.0	108 M/U 14 3/4" BHA	OR,BHI,Weir
24.07.2005 03:00	25.07.2005 23:00	17.4	30.9	0.0	16.1	20.0	44.0	66.1	0.0	109 RIH, drill out shoetrack. Take LOT.	MI,OR,Hall,Geo,BHI,Weir
25.07.2005 23:00	11.08.2005 05:00	282.0	11.8	154.2	6.4	331.0	407.5	17.0	64.5	17 1/2" [NO 6302/6-1]	
25.07.2005 23:00	28.07.2005 06:30	37.5	32.4	23.4	17.1	65.0	55.5	68.4	0.0	110 Drill 14 3/4" hole from 2400 m-3200 m	MI,OR,Geo,BHI,BHI,Weir
28.07.2005 06:29	28.07.2005 06:30	13.6	33.0	9.6	17.5	0.0	0.0	68.4	0.0	111 Casing clean out trip (formerly contingency wiper trip)	OR
28.07.2005 06:29	28.07.2005 06:30	18.7	33.8	0.0	17.5	0.0	0.0	68.4	0.0	112 Assumed bit trip. (Contingency)	MI,OR,Geo,BHI,BHI,Weir
28.07.2005 06:29	28.07.2005 06:30	14.2	34.4	7.0	17.8	0.0	0.0	68.4	0.0	113 POOH and rack BHA.	MI,OR,Geo,BHI,BHI,Weir
28.07.2005 06:30	29.07.2005 16:00	7.0	34.7	2.3	17.9	14.0	33.5	69.8	1.0	114 Circulate hole clean. Pooh and rack bha.	MI,OR,Geo,BHI,BHI,Weir
29.07.2005 16:00	30.07.2005 00:30	8.6	35.0	8.6	18.2	30.0	8.5	70.1	0.0	115 Wireline logging	OR,Geo,Schlum
30.07.2005 00:30	02.08.2005 17:00		35.0		18.2	65.0	88.5	73.8	1.0	116 UR to 17 1/2" hole, circulate hole clean	OR,Geo,Schlum
02.08.2005 17:00	03.08.2005 18:00	30.0	36.3	20.0	19.1	20.0	25.0	74.9	0.0	117 Wireline logging	OR,Geo,Schlum
03.08.2005 18:00	04.08.2005 09:00	11.2	36.7	6.0	19.3	8.0	15.0	75.5	3.0	118 Pull wear bushing	MI,OR,Geo,BHI,BHI,Weir
04.08.2005 09:00	05.08.2005 23:00	37.8	38.3	23.3	20.3	40.0	38.0	77.1	5.0	119 Run 13 3/8" casing	MI,OR,Weath,DQ
05.08.2005 23:00	06.08.2005 22:30	23.5	39.3	13.8	20.9	18.0	23.5	78.0	0.5	120 Cement 13 3/8" casing	OR,Hall,DQ
06.08.2005 22:30	07.08.2005 22:30	15.2	39.9	8.8	21.2	6.0	24.0	79.0	0.0	121 M/U 12 1/4" bha. P/U dp from deck if req'd.	MI,OR,Geo,BHI,BHI,Weir
07.08.2005 02:00	07.08.2005 19:30	36.1	41.4	20.0	22.1	20.0	17.5	79.8	0.5	122 Run wear bushing and test BOP.	MI,OR,Hall,Geo,Weath,DQ
07.08.2005 22:30	08.08.2005 09:30	12.2	41.9	5.5	22.3	7.0	11.0	80.2	0.5	123 RIH with 12 1/4" BHA to 3200m. Kick drill.	MI,OR,Geo,BHI,BHI,Weir
08.08.2005 09:30	08.08.2005 22:00	16.4	42.6	5.9	22.5	8.0	12.5	80.8	0.0	124 Drill out shoetrack/rathole. Take LOT.	MI,OR,Hall,Geo,BHI,BHI, Weir
08.08.2005 22:00	11.08.2005 05:00		42.6		22.5	30.0	55.0	83.0	53.0	125 Squeeze 13 3/8" casing shoe. RIH, drill out and perfom LOT.	MI,OR,Geo,BHI,BHI,Weir
11.08.2005 05:00	25.08.2005 22:00	277.9	11.6	123.4	5.1	269.0	354.0	14.8	43.5	12 1/4" [NO 6302/6-1]	
11.08.2005 05:00	15.08.2005 05:30	38.9	44.3	23.5	23.5	58.0	96.5	87.1	3.0	126 Drill 12 1/4" hole to 3837m	MI,OR,Hall,Geo,BHI,BHI, Weir
15.08.2005 05:30	16.08.2005 17:30	12.6	44.8	5.7	23.8	28.0	36.0	88.6	1.0	127 POOH and rack bha (Back ream out to 13 3/8" shoe)	MI,OR,Geo,BHI,BHI,Weir
16.08.2005 16:30	19.08.2005 12:00	38.6	46.4	22.2	24.7	75.0	67.5	91.4	6.0	128 Wireline logging including Wiper trip	OR,Geo,Schlum
19.08.2005 12:00	20.08.2005 06:30	23.0	47.3	11.9	25.2	17.0	18.5	92.1	0.0	129 R/U and run 9 5/8" liner joints, R/D handling eq.	MI,OR,Geo,Weir
20.08.2005 06:30	21.08.2005 02:30	9.8	47.8	7.2	25.5	8.0	20.0	93.0	0.0	130 Run 9 5/8" Liner on 5 1/2" dp	OR,Geo,Weath,Weath
21.08.2005 02:29	21.08.2005 02:30	51.5	49.9	0.0	25.5	0.0	0.0	93.0	0.0	131 Bit trips (cont)	MI,OR,Geo,BHI,BHI,Weir
21.08.2005 02:29	21.08.2005 02:30	33.7	51.3	17.8	26.2	0.0	0.0	93.0	0.0	132 Wiper Trip (Cont)	MI,OR,Geo,Weir
21.08.2005 02:30	21.08.2005 07:30	17.0	52.0	8.8	26.6	14.0	5.0	93.2	0.0	133 Cement 9 5/8" liner	MI,OR,Hall,Geo,Weath
21.08.2005 07:30	21.08.2005 14:30	19.6	52.8	8.9	27.0	10.0	7.0	93.5	1.0	134 Pull out with liner landing string. L/D hanger running tool.	OR,Geo,Weath

Start time	End time	Budget time hrs	Acc budget days	Tech limit hrs	Acc tech days	Plan time hrs	Act time hrs	Acc actual days	Down time	Description	Companies
21.08.2005 14:30	22.08.2005 16:00		52.8		27.0	25.0	25.5	94.5	0.0	135 Test BOP LD 12 1/4" BHA. Change wash pipe	OR,Geo,Weath
22.08.2005 16:00	23.08.2005 08:30		52.8		27.0	12.0	16.5	95.2	16.5	136 Retest BOP	OR,Geo,Weath
23.08.2005 08:30	24.08.2005 22:00	23.2	53.8	12.7	27.5	8.0	37.5	96.8	1.5	137 M/U 8 1/2" BHA. P/U 86jnts 5" dp. rih	MI,OR,Hall,Geo,BHI,BHI, Weir
24.08.2005 22:00	25.08.2005 22:00	10.0	54.2	4.7	27.7	14.0	24.0	97.8	14.5	138 Drill out shoetrack/rathole. Take LOT. Increase MW to 1,47 SG.	MI,OR,Hall,Geo,BHI,BHI, Weir
25.08.2005 22:00	23.09.2005 03:00	278.4	11.6	156.9	6.5	435.0	677.0	28.2	70.0	8 1/2" [NO 6302/6-1]	
25.08.2005 22:00	28.08.2005 09:30	10.5	54.6	5.3	27.9	10.0	59.5	100.3	11.5	139 Drill to core point. Circ hole clean.	MI,OR,Geo,BHI,BHI,Weir
28.08.2005 09:30	29.08.2005 07:30	13.0	55.2	7.1	28.2	15.0	22.0	101.2	0.0	140 Pooh, rack bha	MI,OR,Geo,BHI,BHI,Weir
29.08.2005 07:30	29.08.2005 10:00	7.0	55.5	2.3	28.3	8.0	2.5	101.3	0.0	141 PU core barrel	MI,OR,Geo,BHI,BHI,Weir
29.08.2005 10:00	31.08.2005 07:00	9.5	55.9	4.8	28.5	14.0	45.0	103.2	0.0	142 RIH to 3903 m	MI,OR,Geo,BHI,BHI,Weir
31.08.2005 07:00	31.08.2005 19:00	3.0	56.0	1.8	28.6	6.0	12.0	103.7	0.0	143 Cut core	MI,OR,Geo,BHI,Weir
31.08.2005 19:00	01.09.2005 15:30	13.5	56.6	9.4	29.0	16.0	20.5	104.5	0.0	144 Pooh with core	MI,OR,Geo,BHI,Weir
01.09.2005 15:30	01.09.2005 16:30	9.4	57.0	4.7	29.2	6.0	1.0	104.6	0.0	145 L/D core barrel	MI,OR,Geo,BHI,Weir
01.09.2005 16:30	02.09.2005 10:00	0.0	57.0	0.0	29.2	12.0	17.5	105.3	0.0	146 PU new core barrel and RIH	MI,OR,Geo,BHI,Weir
02.09.2005 10:00	02.09.2005 20:30	0.0	57.0	0.0	29.2	6.0	10.5	105.7	0.0	147 Cut core no 2	OR
02.09.2005 20:30	04.09.2005 04:00	0.0	57.0	0.0	29.2	12.0	31.5	107.0	6.0	148 POOH with core and LD same	OR
04.09.2005 04:00	04.09.2005 07:00	4.7	57.2	2.3	29.3	6.0	3.0	107.2	0.0	149 M/U 8 1/2" BHA	MI,OR,Geo,BHI,Weir
04.09.2005 07:00	04.09.2005 21:30	11.3	57.6	5.5	29.5	12.0	14.5	107.8	1.0	150 RIH to cored depth.	OR
04.09.2005 21:30	05.09.2005 03:30	10.0	58.0	6.9	29.8	35.0	6.0	108.0	0.0	151 Ream cored interval and drill 8 1/2" hole to next core point.	MI,OR,Geo,BHI,BHI,Weir
05.09.2005 03:30	05.09.2005 10:00	7.0	58.3	2.3	29.9	6.0	6.5	108.3	0.0	152 Circulate hole clean	MI,OR,Geo,BHI,BHI,Weir
05.09.2005 10:00	06.09.2005 03:30	15.4	59.0	6.8	30.2	15.0	17.5	109.0	0.5	153 POOH and rack 8 1/2" BHA.	MI,OR,Geo,BHI,BHI,Weir
06.09.2005 03:30	08.09.2005 00:00	0.0	59.0	0.0	30.2	56.0	44.5	110.9	0.0	154 MU coring assembly. RIH and cut core no 3. POOH	MI,OR,Geo,BHI,BHI,Weir
08.09.2005 00:00	09.09.2005 09:30	23.1	59.9	14.2	30.7	32.0	33.5	112.3	10.5	155 Test BOP. Clear and clean rig. Rig maintenance.	OR,Hall
09.09.2005 09:30	16.09.2005 00:00	42.7	61.7	25.0	31.8	70.0	158.5	118.9	10.5	156 Drill 8 1/2" hole to TD	MI,OR,Geo,BHI,BHI,Weir
16.09.2005 00:00	23.09.2005 03:00	98.3	65.8	58.5	34.2	98.0	171.0	126.0	30.0	157 Wireline logging	OR,Schlum
23.09.2005 03:00	07.10.2005 07:00	250.2	10.4	183.0	7.6	348.0	302.5	12.6	13.0	PERM P&A [NO 6302/6-1]	
23.09.2005 03:00	25.09.2005 01:00	40.0	67.5	24.0	35.2	60.0	46.0	127.9	4.0	158 Set 8 1/2" OH cmt plugs	MI,OR,Hall,Geo
25.09.2005 01:00	26.09.2005 10:30	40.0	69.1	24.0	36.2	45.0	33.5	129.3	0.0	159 Set 9 5/8" EZSV and place cement plug above	MI,Weath,OR,Geo,Weath
26.09.2005 10:30	27.09.2005 09:00	17.0	69.9	15.0	36.9	45.0	22.5	130.3	5.0	160 Cut and pull 13 3/8" casing	OR
27.09.2005 09:00	27.09.2005 15:00	12.0	70.4	10.0	37.3	10.0	6.0	130.5	0.0	161 Pull wear bushing	MI,Weath,OR,Geo,Weath
27.09.2005 15:00	29.09.2005 00:00	25.0	71.4	25.0	38.3	25.0	33.0	131.9	0.0	162 Pull 13 3/8" casing	MI,Weath,OR,Geo,Weath
29.09.2005 00:00	29.09.2005 17:00	24.0	72.4	20.0	39.1	20.0	17.0	132.6	0.0	163 Set 16" EZSV and place cement plug above	OR
29.09.2005 17:00	30.09.2005 02:00	12.0	72.9	8.0	39.5	12.0	9.0	133.0	1.5	164 Set surface plug	OR

Start time	End time	Budget time hrs	Acc budget days	Tech limit hrs	Acc tech days	Plan time hrs	Act time hrs	Acc actual days	Down time	Description	Companies
30.09.2005 02:00	01.10.2005 04:30	0.0	72.9		39.5	30.0	26.5	134.1	0.0	165 LD tubulars	OR
01.10.2005 04:30	03.10.2005 22:00	50.0	75.0	31.0	40.8	70.0	65.5	136.8	2.5	166 Pull BOP and riser	OR,Ocean
03.10.2005 22:00	05.10.2005 11:30	0.0	0.0	0.0	0.0	47.0	37.5	1.6	0.0	PERM P&A [NO 6302/6-U-1]	
03.10.2005 22:00	04.10.2005 20:00		75.0		40.8	24.0	22.0	137.7	0.0	167 RIH. Set balanced cement plug above TOC inside 20" csg	OR
04.10.2005 20:00	05.10.2005 11:30		75.0		40.8	23.0	15.5	138.4	0.0	168 Cut Wellhead on 6302/6-U-1	OR
05.10.2005 11:30	06.10.2005 08:30	20.2	75.8	18.0	41.5	15.0	21.0	139.2	0.0	169 Cut wh on 6302/6-1	OR,Ocean
06.10.2005 08:30	06.10.2005 15:30		75.8		41.5	8.0	7.0	139.5	0.0	170 Retrieve objects on seabed	OR,Ocean
06.10.2005 15:30	07.10.2005 07:00	10.0	76.2	8.0	41.9	8.0	15.5	140.2	0.0	171 Retrieve transponders and perform ROV area survey.	OR

5.11.5 Wellhead system

Fig. 5.4 Wellhead System Schematic



5.11.6 Drilling fluids

Figure 5.5 Summary of Drilling fluids program

Well: 6302/6-1
Field: PL 251, Tulipan
Rig: Eirik Raude

DRILLING FLUIDS PROGRAMME

Rev. 2 - 08.12.2005

HOLE SIZE	HOLE TVD MD	CASING SIZE	CASING TVD MD	MUD TYPE	MW [SG]	LGS [KG/m³]	10 sec. [Pa]	10 min. [Pa]	Fann 100 rpm	Fann 3 rpm	FV [sec]	PV [mPa]	API FL [ml]	pH	MBT [KG/m³]	NaCl (WPS)	Kcl (WPS)	Gluc. [%]	MEG %	Ca++ mg/l	Total volume Old volume New volume Usage [m³]
42"x 36"	1366,5 1366,5	30"	1363 1363	Sea Water High vis. Swweps Bentonite Displ.fluid	1,03 - 1,35						200		<12								419 318 101 240
				COMMENTS: The section was drilled by using sea water - pumping hivis sweeps. Rec. 318 m3 Bentonite spud mud from well: 6302/6-U-1, 26" section. Built 101 m3 Bentonite spud mud and transferred the remaining 179 m3 over to the next section. Built 101 m3 Bentonite spud mud and transferred the remaining 179 m3 over to the next section. The system performed as expected, no need for changes																
26"	1965 1965	20"	1959,8 1959,8	Sea Water High vis. sweeps KCl/PAC Displ.fluid	1,03 - 1,35 -						122 - 127			8 - 9							1254 385 869 1254
				COMMENTS: The 26" section was drilled using seaweater and CMC hivis sweeps due to MWD readings. The system performed as expected and no changes required. Rec. 179 m3 spud mud from 36" section and 206 m3 1,47 sg Glydril mud from well: 6302/6-U-1, 26" section.																
17"x 20" (optional)	2390 2390	16"	2380,3 2380,3	Glydril DW	1,21 - 1,25	7 - 127	4 - 6	6 - 11	<30	7 - 11		13 - 18	2 - 3,8	8,2 - 11,6	<60	106 - 251	49 - 93	4 - 5,5	13 - 14,5	460 - 900	1950 1698 252 1018
				COMMENTS:The section was drilled by use of Glydril DW. Ran 16" liner.Unable to set it. Cemented as per programme. Tested liner without success. Squeezed 7.2m3 cement into liner lap. 6.8m3 + 14 m3 1.60 SG spacer left in hole. PO and circulated. Dumped approx. 140m3 due to heavy cement contamination, pH >11 and high MW from blended 1.60sg spacer. RIH with 17 ½" clean out assy. Drilled cement and cleaned out to the liner lap. 86m3 mud was dumped due to cement contamination. RIH with 14 ¾" assy. Tagged TOC at 2307 and drilled cement to 2352. At this stage mud was so badly contaminated that it was decided to displace to new mud. A total of 691 m3 Glydril DW was discharged due to heavy contam. The first premixes made in (1100 m3) Kristiansund gave a total of 223 kg/m3 of NaCl in the waterphase and 100 kg/m3 of KCl in the waterphase .Testing on the rig showed that some of the salt had crystallized out of the premix due to oversaturation of the premix. It is recommended to use no more than 60 kg/m3 KCl because too much KCl may lead to precipitation of salt, mostly NaCl. In agreement with Statoil started the section with the mud outside spec. on the NaCl concentration.																

17 1/2"	3046 3046	**13 3/8"**	3035 3035	Glydril DW	1,20 - 1,42	28 - 107	4 - 5	6 - 8	<30	8 - 10		19 - 24	1,7 - 2	8,5 - 9,7	<60	200 - 220	63 - 84	4,8 - 5,6	14,5 - 15	400 - 600	1481 1332 149 352
	COMMENTS: The section was drilled by use of Glydril DW. Not able to pass through 16" liner due to clay on liner wall. POOH with logging tool. M/U 17 ½" underreamer assembly and RIH. Drilled 17 ½" hole to 3046m. Circulated two times BU. Backreamed to 16"liner shoe and circulated 1xBU. Cleanup up inside 16" liner using underreamer and maximum obtained flowrate of 1000lpm. Circulated at full rate when inside 20" casing. A lot of cuttings over the shaker. Heavy losses during last metres of casing running and lost 500-1500ltr/min at pumprate 1000/2500 ltr/min during displacement. Not able to pass with Wire line tool through 16" liner due to clay on liner wall. Defoam AL showed to be very effective even in small amounts using Glydril DW mud. If signs of air in active mud, punch a small hole in a 25ltr can, place on grating between shakers and let it drip into mudflow to process pits. 1-2 cans per shift were used while drilling.																				
12 1/4"	3842 3842	**9 5/8"**	3840 3840	Glydril DW	1,40 - 1,41	2 - 41	4,5 - 6	7 - 11	<30	8 - 10		15 - 26	1,9 - 2,5	8,2 - 9	21 - 24	190 - 228	82 - 86	5 - 6,5	14,8 - 16	320 - 480	1190 1132 58 92
	COMMENTS: The section was drilled by use of Glydril DW. Drilled 12 ¼" hole to 3151 m while adding 25kg/m3 LCM material to the active system (2kg/m3 CaCO3 M, 10kg CaCO3 C, 3kg/m3 G-Seal F and 10kg/m3 G-Seal). This concentration was maintained until drilling past Ooze formation. Pulled back into casing shoe, experienced tight hole. RIH and drilled ahead, experienced high ECD readings from MWD. Pumped a hivis pill with 110kg/m3 Nutplug M to clean out BHA. Drilled 12 ½" hole to TD at 3839 m. Circulated hole clean and backreamed out to shoe due to tight hole. Circulated BU, RIH and performed wipertrip. Drilled 12 ¼" to 3842 m. Circulated hole clean and POOH. RIH with logging tool, couldn't pass tight spot in 13 3/8" csg at 2680. POOH. Ran wiper trip and increased glydril MC conc from 5 to 6.5%. No tight spots on second attempt. 'After the cementjob, a 85 m3 high pH returns from cement contamination was isolatedin a reserve pit and treated with S. Bicarb and C. Acid. The rest of the system was also contaminated in various amounts and was also treated back to spec. The long riser is stretching out contaminated returns to almost the hole 500 m3 system.																				
8 1/2"	4230 4230	**N/A**		Glydril DW	1,47 - 1,56	52 - 148	3,5 - 6	9 - 12	<30	8 - 10		23 - 30	2,1 - 3,2	8 - 10,4	20 - 43	190 - 205	70 - 86	4,8 - 6	15 - 15,4	200 - 560	1447 1098 349 631
	COMMENTS: The section was drilled by use of Glydril DW. Started out section with 1,47sg mudweight and weighted up in steps to 1,56sg as hole dictated.Bit balling occurred on the three first coring runs due to mainly shale/clay formations (thin layers of sand in between. When drilling hard formation (Shale, limestone and sand) at the last 300 m of the 8 ½" section a drop in MEG content was observed. Replaced with total additions of 2.5% MEG. There were now changes in the NaCl (WPS) when adding NaCl powder, see recommendations under 17 X 20" section above. At 3918 m decided to replace ~20% of the active volume with weighted NaCl premix (WPS saturated with NaCl) to raise the NaCl-level, managed to raise it from 187 to ~200 kg/m3. The KCl-level dropped from 83 to 70 kg/m3.																				

5.11.7 Cementing data

Figure 5.6 Summary of Cementing data

HOLE		CASING SHOE		TOC	VOLUME/ EXCESS	CEMENT SLURRY DESIGN										SPACER	DISPLACEMENT
SIZE	TVD MD	SIZE	TVD MD	TVD MD		Components	Lead [liter/sack]	Tail [liter/sack]	Density [SG]	Yield [liter/sack]	Stat. / Circ. Temp [°C]	Thickening time [hr:min]	API Free Water [ml]	API Fluid loss [ml/30min]	24 hrs C.S. [psi]		Fluids and Rates
42" x 36"	1366.5 1366.5	30"	1363 1363	Sea bed Sea bed	Lead: 37 m3 Tail: 15 m3 200%	Norcem "G"+0.1% EZ-FLO CaCl2 liquid Econolite NF-6 Sea water	- 3.20 0.10 95.07	4.35 - 0.10 39.56	L: 1.56 T: 1.95	Code STL10 129.42 Code STT10 75.06	2 / 2 (API)	L: > 6 T: 3 - 4	1 - 2	N/A	L: +/- 100 T: +/- 800	40 m3 Sea water	Sea water 2000 lpm
42" x 36"	1366.5 1366.5	Grouting #1 & #2	1363 1363	Sea bed Sea bed	#1:10 m3 #2: 15 m3	Norcem "G"+0.1% EZ-FLO CaCl2 liquid NF-6 Sea water	#1 4.35 0.10 39.56	#2 - 0.10 42.53	1.95	Code STT10 75.06 Code STTNT 73.69	-2 / 2	#1: 3 - 4 #2: +/- 5	1 - 2	N/A	+/- 500	Sea water	Sea water 1300 - 1500 lpm
26"	1965 1965	20"	1953.8 1953.8	Sea bed Sea bed	Lead : 158 m3 Tail: 28 m3 100%	Norcem "G"+0.1% EZ-FLO Econolite NF-6 Sea water	3.20 0.10 95.07	- 0.10 42.47	L: 1.56 T: 1.95	Code STL10 129.42 Code STTNT 73.66	25 / 12 (Wellcat)	L: 21:31 T: 4:31	1 - 2	N/A	L: +/- 100 T: 2200	20 m3 1.45 SG Tuned Spacer E+	Sea water 3000 lpm
26"	1965 1965	20" Shoe- Squeeze	1953.8 1953.8	1860 1860	20 m3	Norcem "G"+0.1% EZ-FLO NF-6 Sea water		0.10 42.47	1.95	Code STTNT 73.66	25 / 12 (Wellcat)	04:31	1 - 2	N/A	2200	22 m3 1.60 SG Tuned Spacer E+	WBM 2500 lpm
17" x 20"	2390 2390	16"	2380.3 2380.3	1838 1838	27 m3 0% OH	Norcem "G"+0.1% EZ-FLO Halad-99LE+ HR-4L NF-6 Freshwater		0.50 0.80 0.10 42.65	1.92	Code MPT4 75.10	42 / 23 (Wellcat)	05:28	0	N/A	950	20 m3 1.30 SG Tuned Spacer E+	Mud 1000 lpm
17" x 20"	2390 2390	16" Linerlap Squeeze	2380.3 2380.3	1787 1787	17 m3	Norcem "G"+0.1% EZ-FLO NF-6 Sea water		0.10 42.47	1.95	Code STTNT 73.66	25 / 12 (Wellcat)	04:31	1 - 2	N/A	2200	13 m3 1.30 SG Tuned Spacer E+	Mud 1200 lpm
14 1/2" x 17 1/2"	3046 3046	13 3/8"	3035 3035	2835 2835	19 m3 30% OH	Norcem "G"+0.1% EZ-FLO Halad-99LE+ HR-4L NF-6 Freshwater		0.50 1.20 0.10 42.32	1.92	Code MPT4 75.18	70 / 30 (Wellcat)	05:00	1	N/A	1850	20 m3 1.65 SG Tuned Spacer E+	Mud 1000 - 2500 lpm
14 1/2" x 17 1/2"	3046 3046	13 3/8" Shoe- Squeeze	3035 3035	2978 2978	12 m3	Norcem "G"+0.1% EZ-FLO Halad-99LE+ HR-4L NF-6 Freshwater		0.5 1.2 0.1 42.32	1.92	Code MPT4 75.18	70 / 30 (Wellcat)	05:00	1	N/A	1850	118 m3 1.65 SG Tuned Spacer E+	Mud 2500 lpm
12 1/4"	3842 3842	9 5/8"	3840 3840	2966 2966	34 m3 20% OH	Norcem "G" + 35% SSA-1 Microsilica Halad-400L CFR-8L HR-5L NF-6 Freshwater		14 2 0.5 2 0.1 44.4	1.90	Code HT390 107.36	108 / 60 (Wellcat)	05:36	0	71	3000	20 m3 1.45 SG Tuned Spacer E+	Mud 2500 lpm

5.11.8 Bottom hole assemblies

WELLBORE: NO 6302/6-1
BHA NO: 0
BHA KIND: Drilling
DESCRIPTION: 17½" x 26" x 36" x 42" BHA
BHA NAME: 1

Table 5.2 Bottom hole assemblies
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String component	OD in	ID in	Length m	Acc length m
BIT	17.500		0.47	0.47
FLOAT SUB,	9.500	3.000	1.11	1.58
HO TWO STAGE 26" X 36"	36.000	3.000	3.95	5.53
MOTOR, EXTREME	12.750		10.40	15.93
XO SUB	9.000	3.000	0.85	16.78
ANDERDRIFT	8.000	3.000	3.06	19.84
XO SUB	9.000	3.000	1.03	20.87
DRILL COLLAR	9.500	3.000	37.87	58.74
SUB PIN X PIN	9.500	3.000	0.81	59.55
HOLE OPENER	42.000	3.000	2.57	62.12
X-O BIT SUB	9.500	3.000	1.21	63.33
DRILL COLLAR	8.250	2.875	28.11	91.44
XO SUB	8.000	3.000	0.87	92.31
HW DRILL PIPE	5.500	3.375	84.01	176.32

BHA NO: 1
BHA KIND: Drilling
DESCRIPTION: 26" BHA
BHA NAME:

String component	OD in	ID in	Length m	Acc length m
BIT, TRI CONE	26.000		0.68	0.68
BIT SUB W/FLOAT	9.625		0.97	1.65
X-OVER	12.250		2.13	3.78
MPR SUB	8.250		3.72	7.50
MWD	8.250		11.21	18.71
SAVER SUB	8.250		0.81	19.52
XO SUB	8.250	3.000	1.03	20.55
STRING STAB	25.750	3.000	1.87	22.42
DRILL COLLAR	9.500	3.000	9.46	31.88
STRING STAB	24.750	3.000	2.35	34.23
DRILL COLLAR	9.500	3.000	28.40	62.63
X-OVER	9.500	3.000	0.86	63.49
DRILL COLLAR	8.250	2.875	47.25	110.74
JAR	7.750	3.000	9.54	120.28
DRILL COLLAR	8.250	2.875	28.10	148.38
XO SUB	8.250	2.875	0.86	149.24
HW DRILL PIPE	5.500	3.000	84.01	233.25

BHA NO: 2
BHA KIND: Drilling
DESCRIPTION: 17" BHA
BHA NAME: 2

String component	OD in	ID in	Length m	Acc length m
BIT, TRI CONE	17.000		0.44	0.44
BIT SUB W/FLOAT	9.625		0.97	1.41
X-O PIN X PIN	12.250		2.13	3.54
MPR SUB	8.250		3.72	7.26
MWD DCP	8.250		11.21	18.47
SAVER SUB	8.250		0.81	19.28
XO SUB	8.250	3.000	1.22	20.50
STAB STRING	17.000	3.000	2.06	22.56
FLOW SUB	9.500	3.000	0.93	23.49
DRILL COLLAR	9.500	3.000	9.46	32.95
STAB STRING	17.000	3.000	2.20	35.15
X-OVER,	9.500	3.000	0.85	36.00
DRILL COLLAR	8.250	3.000	75.51	111.51
JAR	7.750	3.000	9.54	121.05
DRILL COLLAR	8.250	2.875	28.40	149.45
XO SUB	8.250	2.875	0.50	149.95
DART SUB,	8.000	2.750	0.55	150.50
X-OVER,	8.000	2.750	0.50	151.00
X-OVER,	8.250	2.875	0.87	151.87
HW DRILL PIPE	5.500	3.000	84.01	235.88

BHA NO: 3
BHA KIND: Drilling
DESCRIPTION: 20" UR
BHA NAME: 3

String component	OD in	ID in	Length m	Acc length m
BULL NOSE W/ NOZZLES	9.500	3.000	1.39	1.39
UNDER REAMER,	16.000	3.500	4.37	5.76
X-O PIN X PIN	12.250	3.000	0.92	6.68
MPR SUB	8.250		4.93	11.61
MWD DCP	8.250		11.21	22.82
SAVER SUB	8.250		0.81	23.63
XO SUB	8.250	3.000	1.22	24.85
STAB STRING	17.000	3.000	2.06	26.91
FLOAT SUB	9.500	3.000	0.93	27.84
DRILL COLLAR	9.500	3.000	9.46	37.30
X-OVER,	9.500	3.000	0.85	38.15
DRILL COLLAR	8.250	3.000	75.51	113.66
JAR	7.750	3.000	9.54	123.20
DRILL COLLAR	8.250	2.875	28.40	151.60
XO SUB	8.250	2.875	0.50	152.10
DART SUB,	8.000	2.750	0.55	152.65
X-OVER,	8.000	2.750	0.50	153.15
X-OVER,	8.250	2.875	0.87	154.02

BHA NO: 4
BHA KIND: Drilling
DESCRIPTION: 12 1/4 x 17" stab, clean up BHA
BHA NAME: 6

String component	OD in	ID in	Length m	Acc length m
BIT	17.500		0.48	0.48
BIT SUB	12.250		0.92	1.40
STRING STAB	17.000	3.000	2.06	3.46
DRILL COLLAR	9.500	3.000	9.46	12.92
STRING STAB	17.000	3.000	2.19	15.11
FLOAT SUB	9.500	3.000	0.93	16.04
X-OVER	9.500	3.000	0.85	16.89
DRILL COLLAR	8.250	2.875	75.51	92.40
JAR	8.250	2.875	9.54	101.94
DRILL COLLAR	8.250	2.875	28.40	130.34
X-OVER	8.250	2.875	0.87	131.21
H W DRILL PIPE	5.500	3.000	84.01	215.22

BHA NO: 5
BHA KIND: Drilling
DESCRIPTION: 14 3/4" Drilling assembly
BHA NAME: 7

String component	OD in	ID in	Length m	Acc length m
BIT	14.750		0.50	0.50
BIT SUB	9.625	3.000	0.97	1.47
X-OVER	12.250		0.92	2.39
MPR SUB	8.250		4.93	7.32
MWD DCP	8.250		11.21	18.53
SAVER SUB	8.250		0.81	19.34
X-OVER	8.250	3.000	1.22	20.56
FLOAT SUB	8.250	3.000	0.93	21.49
STRING STAB	14.750	3.000	2.30	23.79
DRILL COLLAR	9.500	3.000	9.46	33.25
STRING STAB	14.750	3.000	2.38	35.63
X-OVER	9.500	3.000	0.85	36.48
DRILL COLLAR	8.250	2.875	75.51	111.99
JAR	8.250	2.875	9.54	121.53
DRILL COLLAR	8.250	2.875	28.40	149.93
X-OVER	8.250	2.875	0.87	150.80
HWDP 5 1/2"	5.500	3.000	84.01	234.81

BHA NO: 6
BHA KIND: Drilling
DESCRIPTION: Open ended DP for cementing
BHA NAME: 5

String component	OD in	ID in	Length m	Acc length m
5 1/2" DRILL PIPE	5.500			

BHA NO: 7
BHA KIND: Drilling
DESCRIPTION: Mill and clean up string
BHA NAME: 4

String component	OD in	ID in	Length m	Acc length m
MILL				

BHA NO: 8
BHA KIND: Drilling
DESCRIPTION: 14 3/4" x 17½" under reamer assembly
BHA NAME: 8

String component	OD in	ID in	Length m	Acc length m
BIT	14.750		0.50	0.50
BIT SUB	9.625	3.000	0.97	1.47
RHINOREAMER	9.375	3.500	4.47	5.94
X-OVER	12.250		0.92	6.86
MPR SUB	8.250		4.93	11.79
MWD DCP	8.250		11.21	23.00
SAVER SUB	8.250		0.81	23.81
X-OVER	8.250	3.000	1.22	25.03
FLOAT SUB	8.250	3.000	0.93	25.96
STRING STAB	14.750	3.000	2.30	28.26
DRILL COLLAR	9.500	3.000	9.46	37.72
STRING STAB	14.750	3.000	2.38	40.10
X-OVER	9.500	3.000	0.85	40.95
DRILL COLLAR	8.250	2.875	75.51	116.46
JAR	8.250	2.875	9.54	126.00
DRILL COLLAR	8.250	2.875	28.40	154.40
DART SUB	9.500	2.875	1.54	155.94
X-OVER	8.250	2.875	0.87	156.81
HWDP 5 1/2"	5.500	3.000	84.01	240.82

BHA NO: 9
BHA KIND: Wireline
DESCRIPTION: PEX logging string
BHA NAME: 1

String component	OD in	ID in	Length m	Acc length m
LOGGING HEAD				

BHA NO: 10
BHA KIND: Wireline
DESCRIPTION: VSP logging string
BHA NAME: 2

String component	OD in	ID in	Length m	Acc length m
LOGGING HEAD			0.67	0.67
ACTS			1.22	1.89
TCC-BF			0.91	2.80
SGT-L			1.68	4.48
CSAT-B2			5.45	9.93
CSSB			4.55	14.48
CSAT-B1			5.45	19.93
BNS-BOTTOM NOSE			0.14	20.07

BHA NO: 11
BHA KIND: Drilling
DESCRIPTION: Pull wear bushing
BHA NAME: 9

String component	OD in	ID in	Length m	Acc length m
BULL NOSE	8.250		0.93	0.93
MPT TOOL	18.250		2.95	3.88
DP 5"	5.000	3.750		3.88

BHA NO: 12
BHA KIND: Drilling
DESCRIPTION: 12 1/4" BHA.
BHA NAME: 10

String component	OD in	ID in	Length m	Acc length m
BIT	12.250		0.33	0.33
MWD, STAB	12.250	3.000	1.21	1.54
MPR SUB	8.250		3.72	5.26
MWD, STAB	12.250		1.28	6.54
MWD DCP	8.250		11.06	17.60
SAVER SUB	8.250		0.84	18.44
FLOAT SUB	8.250	3.000	0.83	19.27
STRING STAB	12.250	3.000	2.16	21.43
FLOAT SUB	8.250	3.000	1.20	22.63
DRILL COLLAR	8.250	2.875	75.51	98.14
JAR	8.250	2.875	9.88	108.02
DRILL COLLAR	8.250	2.875	28.11	136.13
XO SUB	7.875	2.750	0.50	136.63
DART SUB	9.500	2.875	0.55	137.18
XO SUB	8.000	2.813	0.50	137.68

String component	OD in	ID in	Length m	Acc length m
XO SUB	8.250	2.875	0.87	138.55
HWDP 5 1/2"	5.500	3.000	84.01	222.56

BHA NO: 13
BHA KIND: Wireline
DESCRIPTION: PEX logging string
BHA NAME: 11

String component	OD in	ID in	Length m	Acc length m
LOGGING HEAD				

BHA NO: 14
BHA KIND: Wireline
DESCRIPTION: PEX logging string
BHA NAME: 11

String component	OD in	ID in	Length m	Acc length m
LOGGING HEAD				

BHA NO: 15
BHA KIND: Wireline
DESCRIPTION: MSCT logging string
BHA NAME: 11

String component	OD in	ID in	Length m	Acc length m
LOGGING HEAD				

BHA NO: 16
BHA KIND: Drilling
DESCRIPTION: 8 1/2" Drilling assembly
BHA NAME: 12

String component	OD in	ID in	Length m	Acc length m
BIT	8.500		0.24	0.24
MWD, STAB	7.000		1.16	1.40
ON TRAK	8.375		5.16	6.56
MWD, STAB	7.250		1.28	7.84
BCPM	6.937		3.19	11.03
SUB	6.750		0.47	11.50
FLOAT SUB	6.750	2.750	0.53	12.03
STRING STAB	8.375	2.750	1.68	13.71
FLOAT SUB	6.750	2.750	0.92	14.63
DRILL COLLAR	6.750	2.875	56.73	71.36
JAR	7.187	2.875	9.50	80.86
DRILL COLLAR	6.750	2.875	18.92	99.78

String component	OD in	ID in	Length m	Acc length m
H W DRILL PIPE	5.000		9.21	108.99
DART SUB	5.562	2.875	0.64	109.63
HW DRILL PIPE	5.000		127.65	237.28
DRILL PIPE	5.000		808.50	1045.78

BHA NO: 17
BHA KIND:
DESCRIPTION: Coring assembly
BHA NAME: 13

String component	OD in	ID in	Length m	Acc length m
CORE HEAD	8.500	5.375	0.43	0.43
STABILIZER	8.469	5.375	0.79	1.22
CORE BARREL	7.250	5.375	8.35	9.57
STABILIZER	8.469	5.375	0.79	10.36
CORE BARREL	7.250	5.375	8.35	18.71
STABILIZER	8.469	5.375	0.79	19.50
CORE BARREL	7.250	5.375	8.35	27.85
STABILIZER	8.469	5.375	0.79	28.64
CORE BARREL EXT	7.250	5.375	0.93	29.57
TOP SUB	7.250	3.156	0.43	30.00
FLOAT SUB	6.750	2.750	0.53	30.53
FLOAT SUB	6.750	2.750	0.92	31.45
DRILL COLLAR	6.750	2.875	56.73	88.18
JAR	7.187	2.875	9.50	97.68
DRILL COLLAR	6.750	2.875	18.92	116.60
HWDP 5"	5.000		9.21	125.81
DART SUB	5.562	2.875	0.64	126.45
HWDP 5"	5.000		127.65	254.10
DP 5"	5.000		808.50	1062.60
X-OVER	7.000	3.000	1.03	1063.63
DP 5 1/2"				1063.63

BHA NO: 18
BHA KIND:
DESCRIPTION: Coring assembly
BHA NAME: 13

String component	OD in	ID in	Length m	Acc length m
CORE HEAD	8.500	5.375	0.43	0.43
STABILIZER	8.469	5.375	0.79	1.22
CORE BARREL	7.250	5.375	8.35	9.57
STABILIZER	8.469	5.375	0.79	10.36
CORE BARREL	7.250	5.375	8.35	18.71
STABILIZER	8.469	5.375	0.79	19.50
CORE BARREL	7.250	5.375	8.35	27.85
STABILIZER	8.469	5.375	0.79	28.64
CORE BARREL EXT	7.250	5.375	0.93	29.57
TOP SUB	7.250	3.156	0.43	30.00
FLOAT SUB	6.750	2.750	0.53	30.53
FLOAT SUB	6.750	2.750	0.92	31.45

String component	OD in	ID in	Length m	Acc length m
DRILL COLLAR	6.750	2.875	56.73	88.18
JAR	7.187	2.875	9.50	97.68
DRILL COLLAR	6.750	2.875	18.92	116.60
HWDP 5"	5.000		9.21	125.81
DART SUB	5.562	2.875	0.64	126.45
HWDP 5"	5.000		127.65	254.10
DP 5"	5.000		808.50	1062.60
X-OVER	7.000	3.000	1.03	1063.63
DP 5 1/2"				1063.63

BHA NO: 19
BHA KIND: Drilling
DESCRIPTION: 8 1/2" Drilling assembly
BHA NAME: 14

String component	OD in	ID in	Length m	Acc length m
BIT	8.500		0.28	0.28
MWD, STAB	7.000		1.16	1.44
ON TRAK	8.375		5.16	6.60
MWD, STAB	7.250		1.28	7.88
BCPM	6.937		3.19	11.07
SUB	6.750		0.47	11.54
FLOAT SUB	6.750	2.750	0.53	12.07
STRING STAB	8.375	2.750	1.68	13.75
FLOAT SUB	6.750	2.750	0.92	14.67
DRILL COLLAR	6.750	2.875	56.73	71.40
JAR	7.187	2.875	9.50	80.90
DRILL COLLAR	6.750	2.875	18.92	99.82
H W DRILL PIPE	5.000		9.21	109.03
DART SUB	5.562	2.875	0.64	109.67
HW DRILL PIPE	5.000		127.65	237.32

BHA NO: 20
BHA KIND:
DESCRIPTION: Coring assembly
BHA NAME: 13

String component	OD in	ID in	Length m	Acc length m
CORE HEAD	8.500	5.375	0.43	0.43
STABILIZER	8.469	5.375	0.79	1.22
CORE BARREL	7.250	5.375	8.35	9.57
STABILIZER	8.469	5.375	0.79	10.36
CORE BARREL	7.250	5.375	8.35	18.71
STABILIZER	8.469	5.375	0.79	19.50
CORE BARREL	7.250	5.375	8.35	27.85
STABILIZER	8.469	5.375	0.79	28.64
CORE BARREL EXT	7.250	5.375	0.93	29.57
TOP SUB	7.250	3.156	0.43	30.00
FLOAT SUB	6.750	2.750	0.53	30.53
FLOAT SUB	6.750	2.750	0.92	31.45
DRILL COLLAR	6.750	2.875	56.73	88.18

String component	OD in	ID in	Length m	Acc length m
JAR	7.187	2.875	9.50	97.68
DRILL COLLAR	6.750	2.875	18.92	116.60
HWDP 5"	5.000		9.21	125.81
DART SUB	5.562	2.875	0.64	126.45
HWDP 5"	5.000		127.65	254.10
DP 5"	5.000		808.50	1062.60
X-OVER	7.000	3.000	1.03	1063.63
DP 5 1/2"				1063.63

BHA NO: 21
BHA KIND: Drilling
DESCRIPTION: 8 1/2" Drilling assembly
BHA NAME: 14

String component	OD in	ID in	Length m	Acc length m
BIT	8.500		0.28	0.28
MWD, STAB	7.000		1.16	1.44
ON TRAK	8.375		5.16	6.60
MWD, STAB	7.250		1.28	7.88
BCPM	6.937		3.19	11.07
SUB	6.750		0.47	11.54
FLOAT SUB	6.750	2.750	0.53	12.07
STRING STAB	8.375	2.750	1.68	13.75
FLOAT SUB	6.750	2.750	0.92	14.67
DRILL COLLAR	6.750	2.875	56.73	71.40
JAR	7.187	2.875	9.50	80.90
DRILL COLLAR	6.750	2.875	18.92	99.82
H W DRILL PIPE	5.000		9.21	109.03
DART SUB	5.562	2.875	0.64	109.67
HW DRILL PIPE	5.000		127.65	237.32
5" DRILL PIPE	5.000		808.50	1045.82
XO SUB	7.000	3.000	1.03	1046.85

BHA NO: 22
BHA KIND: Wireline
DESCRIPTION: PEX logging string
BHA NAME: 15

String component	OD in	ID in	Length m	Acc length m
LEH-QT			0.89	0.89
AH-169			0.41	1.30
SAH-F			1.49	2.79
ACTS			1.21	4.00
DTC-H			0.92	4.92
HNGS-BA			2.50	7.42
HNGC-B			1.07	8.49
HILT-FTB			6.59	15.08
HRLT-B			7.38	22.46
AH-107			1.22	23.68
CMR-PLUS			4.75	28.43
AH-X-OVER			2.58	31.01

String component	OD in	ID in	Length m	Acc length m
BNS-CCS			0.14	31.15

BHA NO: 23
BHA KIND: Wireline
DESCRIPTION: FMI - MSIP string
BHA NAME: 16

String component	OD in	ID in	Length m	Acc length m
LEH-QT			0.89	0.89
SAH-F			1.49	2.38
ACTS			1.21	3.59
WASH SHOE			1.99	5.58
PPST			1.98	7.56
MAP			6.42	13.98
MAXTRAC TRACTOR SCHLUMB			6.17	20.15
FBST-A			7.43	27.58

BHA NO: 24
BHA KIND: Wireline
DESCRIPTION: MDT string
BHA NAME: 17

String component	OD in	ID in	Length m	Acc length m
LEH-QT			0.89	0.89
TCC-BF			0.92	1.81
ACTS			1.21	3.02
SGT-L			1.68	4.70
MRPC			1.52	6.22
MRHY			2.57	8.79
MRPS			2.44	11.23
LFA			1.55	12.78
MRPO			3.24	16.02
MRSC			1.86	17.88
MRSC			1.87	19.75
MRMS			4.02	23.77

BHA NO: 25
BHA KIND: Wireline
DESCRIPTION: MSCT string
BHA NAME: 18

String component	OD in	ID in	Length m	Acc length m
LEH-QT			0.67	0.67
SGT-L			1.53	2.20
CST-Z			8.81	11.01

BHA NO: 26
BHA KIND: Wireline
DESCRIPTION: MDT string

BHA NAME: 17

String component	OD in	ID in	Length m	Acc length m
LEH-QT			0.89	0.89
TCC-BF			0.92	1.81
ACTS			1.21	3.02
SGT-L			1.68	4.70
MRPC			1.52	6.22
MRHY			2.57	8.79
MRPS			2.44	11.23
LFA			1.55	12.78
MRPO			3.24	16.02
MRSC			1.86	17.88
MRSC			1.87	19.75
MRMS			4.02	23.77

BHA NO: 27
BHA KIND: Wireline
DESCRIPTION: MSCT string
BHA NAME: 18

String component	OD in	ID in	Length m	Acc length m
LEH-QT			0.67	0.67
SGT-L			1.53	2.20
CST-Z			8.81	11.01

BHA NO: 28
BHA KIND: Wireline
DESCRIPTION: VSP logging string
BHA NAME: 19

String component	OD in	ID in	Length m	Acc length m
LOGGING HEAD			0.67	0.67
ACTS			1.22	1.89
TCC-BF			0.91	2.80
SGT-L			1.68	4.48
CSAT-B2			5.45	9.93
CSSB			4.55	14.48
CSAT-B1			5.45	19.93
BNS-BOTTOM NOSE			0.14	20.07

BHA NO: 29
BHA KIND: Wireline
DESCRIPTION: Dual MDT string
BHA NAME: 20

String component	OD in	ID in	Length m	Acc length m
LEH-QT			0.89	0.89
ACTS			1.22	2.11

String component	OD in	ID in	Length m	Acc length m
DTC-H			0.91	3.02
DTA-A			1.22	4.24
SGT-L			1.68	5.92
MRPC			1.52	7.44
MRHY			2.57	10.01
MRPS			2.44	12.45
MRMS			4.02	16.47
MRBA			0.99	17.46
MRSC			1.87	19.33
MRSC			1.86	21.19
MRPO			3.24	24.43
LFA			1.55	25.98
MRHY			2.57	28.55
MRPS			2.44	30.99
MRPC			5.09	36.08
MRPO			3.24	39.32
MRSC			1.87	41.19

BHA NO: 30
BHA KIND: Drilling
DESCRIPTION: 13 3/8" casing cutter
BHA NAME: 21

String component	OD in	ID in	Length m	Acc length m
BULL NOSE W/ NOZZLES	8.000		1.10	1.10
CASING CUTTER	12.000		1.83	2.93
TOP SUB	7.875		0.38	3.31
X-OVER	8.000	3.000	1.00	4.31
PUP JOINT	5.500	2.812	2.45	6.76
DP 5 1/2"	5.500		780.60	787.36
X-OVER	8.000	3.000	1.00	788.36
SPACER SUB	7.750	2.250	1.42	789.78
MARINE SWIVEL	8.750		1.72	791.50
SPACER SUB	7.750	2.250	1.85	793.35
SPACER SUB	8.000	2.875	1.82	795.17
X-OVER	7.875	3.000	0.23	795.40
ANNULAR SWIVEL			6.64	802.04
X-OVER,	7.062	3.250	0.96	803.00

BHA NO: 31
BHA KIND: Drilling
DESCRIPTION: 13 3/8" spear assembly
BHA NAME: 22

String component	OD in	ID in	Length m	Acc length m
PACK OFF	7.875		0.95	0.95
ITCO SPEAR	7.750		1.38	2.33
SPEAR STOP SUB	8.000		0.74	3.07
BUMPER SUB	8.000	3.000	4.20	7.27
JAR	8.000	3.000	4.10	11.37
DRILL COLLAR	8.250	2.875	84.76	96.13

String component	OD in	ID in	Length m	Acc length m
ACCELERATOR	8.000	3.000	5.35	101.48
X-OVER	8.000	3.000	0.84	102.32

BHA NO: 32
BHA KIND: Drilling
DESCRIPTION: Wellhead cutting assy.
BHA NAME:

String component	OD in	ID in	Length m	Acc length m
BULL NOSE	8.000		0.42	0.42
CASING CUTTER	12.000		1.97	2.39
TOP SUB	8.063		2.36	4.75
STABILIZER NON.ROT	8.000	2.750	3.90	8.65
SPACER SUB	8.000	2.812	7.59	16.24
X-OVER	8.000	2.812	8.31	24.55
MOST TOOL	39.500		8.84	33.39
DRILL COLLAR	8.000	2.812	84.76	118.15
X-OVER	8.250		0.86	119.01
HWDP 5 1/2"	5.000	3.500	84.05	203.06

WELLBORE: NO 6302/6-U-1
BHA NO: 1
BHA KIND: Drilling
DESCRIPTION: 42" x 36" tophole BHA
BHA NAME: 1

Table 5.3 Bottom hole assemblies

String component	OD in	ID in	Length m	Acc length m
BIT	17.500		0.40	0.40
FLOAT SUB	9.500	3.000	1.11	1.51
HO TWO STAGE 26" X 36"	36.000	3.000	3.95	5.46
MOTOR	12.750		10.02	15.48
ANDERDRIFT	9.500	3.000	3.07	18.55
DRILL COLLAR	9.500	3.125	37.87	56.42
PIN-PIN SUB,	9.500	3.000	0.81	57.23
HOLE OPENER	42.000		2.57	59.80
X-O BIT SUB	9.500	3.000	1.20	61.00
DRILL COLLAR	8.250	2.875	9.43	70.43
DRILL COLLAR	8.313	2.875	9.36	79.79
DRILL COLLAR	8.250	2.875	9.33	89.12
X-OVER	8.250	2.875	0.87	89.99
H W DRILL PIPE	5.500	3.250	84.00	173.99

BHA NO: 2
BHA KIND: Drilling
DESCRIPTION: 26" BHA
BHA NAME: 2

String component	OD in	ID in	Length m	Acc length m
BIT	26.000		0.68	0.68
BIT SUB W/FLOAT	9.625		0.97	1.65
X-OVER	12.250		2.13	3.78
MPR SUB	8.250		3.72	7.50
MWD	8.250		11.21	18.71
SAVER SUB	8.250		0.81	19.52
X-OVER	8.250	3.000	1.03	20.55
STRING STAB	25.750	3.000	1.87	22.42
DRILL COLLAR	9.500	3.000	9.46	31.88
STRING STAB	24.750	3.000	2.35	34.23
DRILL COLLAR	9.500	3.000	9.45	43.68
DRILL COLLAR	9.500	3.000	9.48	53.16
DRILL COLLAR	9.500	3.000	9.47	62.63
X-OVER	9.500	3.000	0.86	63.49
DRILL COLLAR	8.250	2.875	47.25	110.74
JAR	7.750	3.000	9.54	120.28
DRILL COLLAR	8.250	2.875	28.10	148.38
X-OVER	8.250	2.875	0.86	149.24
HW DRILL PIPE			84.01	233.25
DP 5 1/2"				233.25

BHA NO: 3
BHA KIND: Drilling
DESCRIPTION: 26" BHA
BHA NAME: 3

String component	OD in	ID in	Length m	Acc length m
BIT	26.000		0.68	0.68
BIT SUB W/FLOAT	9.625		0.97	1.65
X-OVER	12.250		2.13	3.78
MPR SUB	8.250		3.72	7.50
MWD	8.250		11.21	18.71
SAVER SUB	8.250		0.81	19.52
X-OVER	8.250	3.000	1.03	20.55
DRILL COLLAR	9.500	3.000	9.46	30.01
STRING STAB	24.750	3.000	2.35	32.36
DRILL COLLAR	9.500	3.000	9.45	41.81
DRILL COLLAR	9.500	3.000	9.48	51.29
DRILL COLLAR	9.500	3.000	9.47	60.76
X-OVER	9.500	3.000	0.86	61.62
DRILL COLLAR	8.250	2.875	47.25	108.87
JAR	7.750	3.000	9.54	118.41
DRILL COLLAR	8.250	2.875	28.10	146.51
X-OVER	8.250	2.875	0.86	147.37
HW DRILL PIPE			84.01	231.38
DP 5 1/2"				231.38

BHA NO: 4
BHA KIND: Drilling
DESCRIPTION: Wellhead cutting assy.
BHA NAME: 4

String component	OD in	ID in	Length m	Acc length m
BULL NOSE	8.000		0.42	0.42
CASING CUTTER	12.000		1.55	1.97
TOP SUB	8.063		0.39	2.36
STABILIZER NON.ROT	8.000	2.750	1.54	3.90
SPACER SUB	8.000	2.812	3.69	7.59
X-OVER,	8.000	2.812	0.72	8.31
MOST TOOL	39.500		8.84	17.15
DRILL COLLAR	8.000	2.812	84.76	101.91
X-OVER,	8.250		0.86	102.77
HWDP 5 1/2"	5.500	3.500	84.05	186.82

5.11.9 Bit record

WELL: NO 6302/6-1

Table 5.4 Bit run listing, well 6302/6-1

Run no	Bit size	Bit no	BHA no	Bit type	IADC code	Bit manufacturer
1	17 1/2"	1	1	T11C	115	Reed-Hycalog
1	42"	1	1	HOLE OPENER		Odfjell Drilling AS
1	26"/36"	1	1	HOLE OPENER		Odfjell Drilling AS
2	26"	2RR	2	T11C	115	Reed-Hycalog
3	17"	3	3	EMS13GKC	135	REED
3	20"		3	UNDERREAMER		Red Baron
4	17"	2	2	EMS13GKC	135	REED
6	17 1/2"	3	3	T13CDH	135	Reed-Hycalog
7	14 3/4"	4	4	T11C	115	Reed-Hycalog
8	14 3/4"	4RR1	8	T11C	115	Reed-Hycalog
8	17 1/2"		8	RHINOREAMER	UR	Smith Red Baron
9	12 1/4"		12	MXC03D	417	Hughes Christensen
10	12 1/4"	5	12	MXT09DX	437	Hughes Christensen
11	8 1/2"	6	11	MXO9DX	437	Hughes Christensen
12	8 1/2"	6	11	MX09DX	437	Hughes Christensen
13	7"	7	12	HC606	M323	Hughes Christensen
13	8 1/2"	7	12	HC606	M323	Hughes Christensen
14	8 1/2"	7rr	13	HC606	M323	Hughes Christensen
15	8 1/2"	8	14	LD565ATHG	M323	Lyng
16	8 1/2"	7rr2	15	HC606	M323	Hughes Christensen
17	8 1/2"	8RR	21	LD565ATHG	M323	Lyng

					Nozzles (n/32")				
Run no	Bit size	Bit no	BHA no	Serial no	no x n	no x n	no x n	no x n	Flow area in
1	17 1/2"	1	1	869172	1 x 14	3 x 18	x	x	0,8960
1	42"	1	1		x	x	x	x	
1	26"/36"	1	1		6 x 12	x	x	x	0,6630
2	26"	2RR	2	B69914	1 x 19	3 x 20	x	x	1,1980
3	17"	3	3	k18745	3 x 18	1 x 16	x	x	0,9420
3	20"		3	G84744	3 x 10	3 x 20	x	x	1,1510
4	17"	2	2	k18745	3 x 18	1 x 16	x	x	0,9420
6	17 1/2"	3	3	K48149	1 x 16	1 x 22	2 x 22	x	1,3110
7	14 3/4"	4	4	D80393	2 x 18	1 x 16	1 x 14	x	0,8440
8	14 3/4"	4RR1	8	D80393	2 x 18	1 x 16	1 x 14	x	0,8440
8	17 1/2"		8	SRB41725D	3 x 8	x	x	x	0,1480
9	12 1/4"		12	6036805	2 x 18	2 x 20	x	x	1,1110
10	12 1/4"	5	12	6038219	2 x 18	2 x 20	x	x	1,1110
11	8 1/2"	6	11	6034175	1 x 16	2 x 18	x	x	0,6940
12	8 1/2"	6	11	6034175	1 x 16	2 x 18	x	x	0,6940
13	7"	7	12	7107901	x	x	x	x	1,18
13	8 1/2"	7	12	7107901	x	x	x	x	1,18
14	8 1/2"	7rr	13	7107901	x	x	x	x	1,18
15	8 1/2"	8	14	2681	4 x 12	2 x 13	x	x	0,7020
16	8 1/2"	7rr2	15	7107901	x	x	x	x	1,18

					Nozzles (n/32")				
Run no	**Bit size**	**Bit no**	**BHA no**	**Serial no**	**no x n**	**no x n**	**no x n**	**no x n**	**Flow area in**
17	8 1/2"	8RR	21	2681	4 x 12	2 x 13	x	x	0.7020

Run no	**Bit size**	**Pump rate l/min**	**Pump press bar**	**Depth in mMD**	**Depth out mMD**	**Form drld m**	**Total drld m**	**Drld hrs**	**Circ hrs**	**ROP m/hrs**
1	17 1/2"	4531	137	1285.5	1366.5	81.0	81.0	7.5	14.6	10.8
1	42"	4531	137	1285.5	1306.0	20.5	21.0	7.5	14.6	2.7
1	26"/36"	4531	137	1285.5	1362.0	76.5	77.0	7.5	14.6	10.2
2	26"	4530	187	1366.5	1965.0	598.5	610.0	24.2	41.2	24.7
3	17"			1965.0	1968.0	3.0	3.0			
3	20"	3960	220							
4	17"	4000	235	1965.0	2390.0	425.0	425.0	24.1	65.6	17.6
6	17 1/2"	4000	160							
7	14 3/4"	3500	268	2390.0	3046.0	656.0	701.0	29.3	70.3	22.4
8	14 3/4"	3450	251	2380.0	3046.0	666.0	666.0	27.2	56.5	24.5
8	17 1/2"	3450	251	2380.0	3043.1	663.1	663.1	27.2	56.5	24.4
9	12 1/4"			3046.0	3049.0	3.0	42.0	2.8	12.3	1.1
10	12 1/4"	3526	297	3049.0	3842.0	793.0	793.0	54.4	106.1	14.6
11	8 1/2"			3842.0						
12	8 1/2"			3842.0	3903.0	61.0	103.0	7.8	28.3	7.8
13	7"									
13	8 1/2"			3903.0	3911.0	8.0	8.0	10.0	24.3	0.8
14	8 1/2"			3911.0	3918.0	7.0	7.0	4.6	15.9	1.5
15	8 1/2"			3918.0	3936.0	18.0	18.0	3.3	11.1	5.5
16	8 1/2"			3936.0	3941.5	5.5	5.5	4.9	11.8	1.1
17	8 1/2"	2150	322	3941.5	4230.0	288.5	288.5	86.5	102.8	3.3

Run no	**Bit size**	**Min WOB ton**	**Max WOB ton**	**Min RPM**	**Max RPM**	**Torque Min Nm**	**Torque Max Nm**	**Con drag Min 1000 daN**	**Con drag Max 1000 daN**
1	17 1/2"	0	1	0	60		6		
1	42"	0	1	0	60		6		
1	26"/36"	0	1	0	60		6		
2	26"	0	7	60	150	3	18		
3	17"								
3	20"								
4	17"	2	10	50	120	2	8		
6	17 1/2"								
7	14 3/4"	2	5		120	5000	8000		
8	14 3/4"	1	3	100	145	4000	6500		
8	17 1/2"	1	3	100	145	4000	6500		
9	12 1/4"								
10	12 1/4"	2	25	60	130	5	10		
11	8 1/2"								
12	8 1/2"								
13	7"								
13	8 1/2"								
14	8 1/2"								
15	8 1/2"								
16	8 1/2"								
17	8 1/2"	1	24	60	180	5	20		

Run no	Bit size	I	O	DC	L	B	G	OC	RP
1	17 1/2"								
1	42"								
1	26"/36"								
2	26"	1	1	WT	A	E	I	NO	TD
3	17"								
3	20"								
4	17"	5	3	LT	1	E	I	WT	TD
6	17 1/2"	1	1	WT	A	E	I	CT	TD
7	14 3/4"	1	1	NO	A	E	I	NO	TD
8	14 3/4"	1	1	NO	A	E	I	NO	TD
8	17 1/2"								
9	12 1/4"	1	1	NO	3	Q	I	NO	HP
10	12 1/4"	1	1	NO		E	I	NO	TD
11	8 1/2"								
12	8 1/2"	1	1	NO	A	E	I	NO	CP
13	7"								
13	8 1/2"	1	1	WT	A	X	I	PN	PR
14	8 1/2"	1	1	WT	A	X	I	PN	PR
15	8 1/2"	1	1	NO	A	X	I	NO	CP
16	8 1/2"	1	1	WT	A	X	I	PN	PR
17	8 1/2"	8	8	CT	S	X	I	BT	TD

Run no	Bit size	Remarks
1	17 1/2"	
1	42"	Blank nozzles
1	26"/36"	
2	26"	Rerun bit. Drilled 11,5 m cement in 30" conductor shoe track. 470 krevs.
3	17"	Drill 3 m new formation prior to LOT. POOH to perform squeeze.
3	20"	Type: Rhino 16000 DTU 20" cutter blocks: 3x10 nozzles, 9 1/2" bull nose: 3x20 nozzles Grading of Underreamer after opened up hole from 17" to 20" and reamed the hole section: Wear on knifes 30%.
4	17"	
6	17 1/2"	Drilled out cement inside the 20" casing after 16" liner lap squeeze job
7	14 3/4"	Drilled cement from 2307 m to 2352 m
8	14 3/4"	Pilot bit in under reamer BHA.
8	17 1/2"	Grading: G:3 B:2 D:2 L:UB
9	12 1/4"	Drill out shoe track. Soft cement in shoe track and rat hole. Cone #3 rotating freely.
10	12 1/4"	Make wiper trip due to wire line misrun.
11	8 1/2"	
12	8 1/2"	
13	7"	
13	8 1/2"	Core jammed off at 3911 m.
14	8 1/2"	Core jammed off at 3918 m. 5 out of 6 waterways balled up.
15	8 1/2"	
16	8 1/2"	Core jammed of at 3941.5 m. 5 out of 6 waterways balled up. 5 out of 6 fixed nozzles plugged.
17	8 1/2"	7 chipped/broken cutters on 3 blades. 1 broken blade.

WELL: NO 6302/6-U-1

Table 5.5 Bit run listing, well 6302/6-U-1

Run no	Bit size	Bit no	BHA no	Bit type	IADC code	Bit manufacturer
1	17 1/2"	1	1	EMS13GKC	135	REED
1	26"/36"	2	1	HOLE OPENER		Odfjell Drilling AS
1	42"	3	1	HOLE OPENER		Odfjell Drilling AS
2	26"	2	2	T11C	115	Reed-Hycalog
3	26"	2rr	3	T11C	115	Reed-Hycalog

					Nozzles (n/32")				
Run no	Bit size	Bit no	BHA no	Serial no	no x n	no x n	no x n	no x n	Flow area in
1	17 1/2"	1	1	N67093	1 x 14	3 x 18	x	x	0.8960
1	26"/36"	2	1		x	x	x	x	
1	42"	3	1		x	x	x	x	0
2	26"	2	2	B69914	1 x 19	3 x 20	x	x	1.1980
3	26"	2rr	3	B69914	1 x 19	3 x 20	x	x	1.1980

Run no	Bit size	Pump rate l/min	Pump press bar	Depth in mMD	Depth out mMD	Form drld m	Total drld m	Drld hrs	Circ hrs	ROP m/hrs
1	17 1/2"	4600	152	1294.0	1366.0	72.0	75.0	10.0		7.2
1	26"/36"									
1	42"									
2	26"	4500	205	1366.0	2122.0	756.0	765.0	32.3	61.7	23.4
3	26"									

Run no	Bit size	Min WOB ton	Max WOB ton	Min RPM	Max RPM	Torque Min Nm	Torque Max Nm	Con drag Min 1000 daN	Con drag Max 1000 daN
1	17 1/2"	0	2	0	60	2	6		
1	26"/36"								
1	42"								
2	26"	1	5		120	5000	20000		
3	26"								

Run no	Bit size	I	O	DC	L	B	G	OC	RP
1	17 1/2"	2	2	WT	A	E	1	NO	TD
1	26"/36"								
1	42"								
2	26"	2	1	CT	M	E	I	NO	HP
3	26"								

Run no	Bit size	Remarks
1	17 1/2"	42" hole opener: Like new. 36" hole opener: Like new 26" hole opener. Like new
1	26"/36"	
1	42"	
2	26"	
3	26"	

6 Appendices

App A Extract of daily activities (DBR summary of activities)

WELLBORE ID: NO 6302/6-U-1
INTERVAL: MOBILIZ
START TIME: 21.05.2005 17:00
END TIME: 29.05.2005 16:30

Report date	Description
22.05.2005	Moved rig 406 NM to 69 deg at average speed of 6,0 knots. Passed 69 deg at 16:55 hrs. Continued to move rig towards KSU. Total rig move 487NM at average speed of 6.2 knots.
23.05.2005	Moved rig towards KSU. Total rig moove 627 NM at average speed of 6.1 knots.
24.05.2005	Moved rig towards KSU. Total rig move; 757 NM at an average speed of 6.0 knots.
25.05.2005	Loading/ backloading equipment for Tulipan well 6302/6-1
26.05.2005	Loaded materials for Tulipan well NO6302/6-1
27.05.2005	Loaded materials for Tulipan well NO6302/6-1.
28.05.2005	Loaded materials for Tulipan well 6302/6-1. Moved rig 58 NM at average speed of 4.5 knots.
29.05.2005	Rig in transit to Tulipan. On location at 2230 hrs. Ballasted rig to drilling draugh. Commenced with DP tests and deployed 5 out of 6 transponders. Meanwhile MU and racked back cement head and 5 1/2" DP stands. Prepared for testining BOP

INTERVAL: 42" x 36"
START TIME: 29.05.2005 16:30
END TIME: 05.06.2005 00:30

Report date	Description
30.05.2005	Deployed transponder #6. Calibrated array and performed DP tests. Meanwhile MU 5 1/2" DP and 36" BHA. Found and repaired communication failure betwixt ROV transponder and rig HIPAP. Changed wash pipe on top drive. Jumped ROV and basket with 4 marker bouys. Lost communication with rig HIPAP. Lost power to ROV. Recoverd ROV and basket. Found all 4 marker buoys in basket collapsed. Continued to MU and racked back 5 1/2" DP.
31.05.2005	Made up and racked back 5 1/2" DP. Meanwhile troubleshooted and repaired ROV.
01.06.2005	Repaired ROV. Performed test dive. Found ROV transducer out of order. Corrected transducer. Jumped ROV and marker buoys. Set bit at bottom and positioned rig over well center. Placed the marker buoys on seabed. Spudded in and drilled 36" hole from 1283 m to 1293 m.
02.06.2005	Drilled 36" hole to 1366 m. Pooh. Rigged up and ran shoe joint and 4 intermediate joints to 61 m.
03.06.2005	Ran 30/36" conductor with 5" stinger on 5" landingstring. Stabbed in and set conductor with 3 m stick up and shoe at 1363.4 m. Bullseyes readings 0/ 0.25 deg. Mix and pumped 15 m3 tuned light slurry. Aborted job due to stop in transfer off bulk from Silo A to surge tank. Displaced cement out of hole. Prepared contingency cement job with G-cement.
04.06.2005	Mixed and pumped 25/15 m3 lead/ tail cement slurry. Waited on cement. Released 36" running tool. Grouted 30" conductor. POOH with running tool. MU cement stand.

INTERVAL: 26"
START TIME: 05.06.2005 00:30
END TIME: 23.06.2005 14:30

Report date	Description
05.06.2005	MU 20" cement stand. MU and RIH with 26" BHA. Drilled shoetrack and cleaned out rat hole. Drilled 26" hole from 1366 m to 1464 m.
06.06.2005	Drilled 26" hole from 1464 m to 1829 m.
07.06.2005	Drilled 26" hole from 1829 m to 1958 m. Refilled hydraulic oil on ROV. Drilled 26" hole from 1958 m to 2044 m.
08.06.2005	Drilled 26" hole from 2044 m to 2122 m. Observed water kick. Mixed sufficient kill mud. Circulated kill mud. Flowchecked well with ROV, well stable.
09.06.2005	Flow checked well. Well stable. POOH. Well flowing. Racked back 26" BHA. Mixed kill mud. RIH with open ended DP.
10.06.2005	RIH with open ended 5 1/2" DP to 2121 m. Mixed and pumped 457 m3 1.45 sg kill mud. Well stable. POOH. MU 26" clean out assembly and RIH to 120 m.
11.06.2005	RIH with 26" clean out assembly. Displaced 50 m3 1.45 sg glydril mud. POOH with clean out assembly. Prepared to run 20" casing.
12.06.2005	RU and ran 20" casing to 326 m. Modified Power Shope Tong. Continued RIH with 20" casing from 326 m to 824 m.
13.06.2005	Run and land 20" casing. Attempted to cement 20" casing, no go.
14.06.2005	Repaired cement unit. Mixed 270 m3 1.47 sg mud. Mixed 20 m3 1.47 sg spacer.
15.06.2005	Assembled cement unit. Displaced well to 1.47 sg mud. Well stable. Pumped 20 m3 spacer. Attempted to cement 20" casing, no go. Displaced out cement.
16.06.2005	Awaited mud from town.
17.06.2005	Mixed 1.47 sg mud and spacer. Mixed and pumped 168 m3 deep water flow stop slurry. Displaced same. Locked down wellhead. Released wellhead RT and POOH with same to 1092 m.
18.06.2005	LD WHRT and 26" bit. RU and ran BOP / riser.
19.06.2005	Lined up and pressure tested choke, kill and glycol injection lines. Unable to get pressure test on conduit line. Trouble shot leakage. Decided to respud well. Pulled riser/BOP. Rigged down riser handling gear. Cleared the drill floor. Performed preventive maintenace on top drive.
20.06.2005	Awaited directives from shore, meanwhile performed preventive maitenance and repaired link tilt assembly on top drive and repaired BOP conduit line valve. Ran BOP and riser to 224 m.
21.06.2005	Ran BOP/Riser from 224 m to 1241 m. PU and MU slip joint to riser string.
22.06.2005	MU slip joint. Installed choke, kill and conduit line goose necks. Observed increased returns from one flow by port on conductor housing. Discussed with land organisation and decided to respud well. Rigged down goose necks. POOH with BOP/riser to 1162 m. Took time out for safety due to dropped object from marine riser.
23.06.2005	Pulled riser/BOP to surface.

WELLBORE ID: NO 6302/6-1
INTERVAL: 42" x 36"
START TIME: 23.06.2005 14:30
END TIME: 28.06.2005 02:00

Report date	Description
24.06.2005	MU 36" x 42" BHA. RIH and tagged seabed at 1285.5 m. Verified string position and spudded well. Drilled 17½" x 36" hole to 1333 m.

Report date	Description
25.06.2005	Drilled 36" x 42" hole. Circulated hole clean, displaced well to 1.35 sg mud. Verified depth with ROV, drilled to TD. Circulated hole clean, displaced well to 1.35 sg mud. POOH. RU and ran 30" x 36" conductor. Landed conductor at setting depth.
26.06.2005	Hooked up cement hose to cement manifold, pressure tested surface lines. Mixed and pumped 37 m³ lead and 15m³ tail cement slurries. Displaced cement and WOC for 12 hrs. Released conductor housing RT and stabbed into 36" x 42" annulus. Pumped 13m³ of planned 20m³ cement slurry - unable to mix cement - aborted cementing. Pulled out of 36" x 42" annulus, flushed landing string. POOH to 216 m.
27.06.2005	POOH cement stinger. MU 26" BHA and racked in derrick. MU handling sub to 18 3/4" WHRT. MU 5½" muleshoe and RIH. Stabbed into 36" x 42" annulus to check TOC. TOC at 1295.5 m and 1293 m. Waited on repairs to cement unit, meanwhile installed nominal bore protector in 18 3/4" WHH. Temporarily repaired cement unit. Performed 17 m³ grouting in 36" x 42" annulus. POOH.

INTERVAL: 26"
START TIME: 28.06.2005 02:00
END TIME: 10.07.2005 16:30

Report date	Description
28.06.2005	POOH 5½" mule shoe. MU 26" BHA. RIH to 10 m above 30" conductor housing. WOC. Stabbed into well, drilled out cement and shoe track. Drilled 26" hole to 1438 m.
29.06.2005	Drilled 26" hole from 1438 m to 1849 m.
30.06.2005	Drilled 26" hole to TD at 1965 m. Circulated hole clean, flow checked observing with ROV and displaced hole to 1.35 sg mud. POOH 26" BHA. RU 20" casing running gear.
01.07.2005	Ran 20" casing to 666 m. PU 18 3/4" WH housing.
02.07.2005	Made up wellhead housing and ran casing to sea-bed. Stabbed into conductor and displaced casing to 1.35sg mud. Ran casing to setting depth without any hole problems. Landed wellhead housing in conductor housing. Circulated one annulus volume. Held pre-job meeting and cemented the 20" casing. Released running tool and POOH. LD running tool.
03.07.2005	LD running tool and plug launcer. Rigged up and ran BOP stack to 456 m.
04.07.2005	Ran BOP stack from 456 m to 1277 m. Installed slip joint and drape hoses.
05.07.2005	Installed drape hoses on to slip joint. Landed BOP and pressure tested casing/ wellhead connector 200 bar. Laid down riser handling equipment.
06.07.2005	Changed to drilling bails and elevator. Changed top drive saver sub. Attempted to pressure test kelly hose and valves. No go due to leakage in test lines.Tested diverter element. Flushed starboard de-gasser line. Re-loaded cement head. MU 17" BHA. Troubleshoot failure on Hydraracker. Pressure tested kelly hose and valves on top drive. Discoverd leakage in remote operated kelly cock. Reparing kelly cock. Meanwhile troubleshoot failure on Hydraracker. Break test lines.
07.07.2005	RIH to 1927 m. Drilled shoe track to 1957 m. Displaced well to 1.23 SG mud. Drilled shoe track and shoe to 1960 m. Cleaned rathole to 1965 m. Drilled 3 m new formation and curculated hole to even mudweight. Attempted to pressure test surface lines prior to LOT. No go due to leakage in several valves on choke manifold.
08.07.2005	Repaired leakages on standpipe/ testing manifold. Attempting to perform acceptable LOT. Circulated condition mud. POOH to 178 m.
09.07.2005	POOH and racked back 17" BHA. RIH cement stinger. Squeezed cement into formation. POOH.
10.07.2005	POOH from 1092 m. Broke 5 1/2" cement stinger. MU and RIH 17" BHA. Drilled cement from 1883 m to 1968 m. Drilled 2 m new formation to 1970 m. Circulated cond. mud and hole. Spotted hi-vis pill in open hole section. Performed FIT to EMW 1.29 SG. Displaced hole from 1.19 SG mud to 1.21 sg mud.

INTERVAL: 17"X20"
START TIME: 10.07.2005 16:30
END TIME: 25.07.2005 23:00

Report date	Description

Report date	Description
11.07.2005	Displaced hole to 1.21 SG mud. Established fingerprints for different drilling functions. Drilled 2 m new formation and repated FIT to 1.29 SG EMW. Drilled 17" hole from 1972 to 2069 m. Circulated and reamed hole.
12.07.2005	Drilled 17" hole to 2088 m. Closed in well and observed pressure. Drilled 17" hole to 2159 m. Raised mudweight from 1.21 SG to 1.23 SG mud. Drilled 17" hole 2275 m. Circulated and conditioned mud and hole due to increasing ECD. Drilled 17" hole to 2304 m.
13.07.2005	Drilled 17" hole to 2325 m. Circ/cond mud. Drilled 17" hole to 2337 m. Closed in and checked for pressure. Drilled to section TD at 2390 m. Circ. bottoms up. POOH to 2338 m. Pumped out of hole to casing shoe at 1960 m. Circulated bottoms up and flow checked well. POOH to 1700 m.
14.07.2005	POOH 17" BHA from 1700 m. Racked back BHA. Troubleshoot MWD down loading system. MU 20" UR BHA. RIH to 20" casing shoe at 1960 m..
15.07.2005	Opened up 17" hole to 20" from 1968 m to 2365 m.
16.07.2005	Opened up 17" hole to 20" from 2365 m to 2386 m. Circulated hole clean and POOH, Observed tight spots on the way out. Cleaned out cement in 20" casing. Reamed hole from 1960 m to 2369 m.
17.07.2005	Reamed 20" hole from 2369 m to 2386 m. Circulated hole clean and POOH. RIH with wear bushing RT to 1150 m.
18.07.2005	Pulled wear bushing. RU and ran 16" liner to 776 m.
19.07.2005	RIH with 16" liner to 2381 mMD. Attempted to set hanger, no go. Established circulation and cemented 16" liner.
20.07.2005	Displaced cement. Landed 16" liner. Released running tool and POOH with same. RIH and pressure tested BOP. POOH with BOP test tool at 250 m..
21.07.2005	POOH with BOP test tool. Pressure tested surface BOP equipment. RIH and set bore protector. RIH and cleaned 16" liner hanger top.
22.07.2005	Mixed and pumped 17 m3 1.95 sg cement slurry. Squeezed 7 m3 cement into formation. WOC. Circulated BU.
23.07.2005	POOH with open ended DP. MU and RIH with 17 1/2" clean out assembly. Drilled cement from 1787 m to 1834 m.
24.07.2005	Drill excess cement in 20" casing. POOH with 17 1/2" clean out assembly. Pressure tested 16" liner lap. MU and RIH with 14 3/4" BHA to 1238 m.
25.07.2005	RIH with 14 3/4" BHA. Drilled cement from 2300 m to 2353 m. Displaced hole to new mud. Pressure tested floats in BHA. Performed finger printing.

INTERVAL: 17 1/2"
START TIME: 25.07.2005 23:00
END TIME: 11.08.2005 05:00

Report date	Description
26.07.2005	Performed finger printing. Drilled float, shoe track and shoe. Cleaned out rathole. drilled 3 m new formation . Performed LOT equivalent to 1.60 sg. Drilled 14 3/4" hole from 2394 m to 2419 m. Performed FIT to 1.46 equivalent MW. Took slow circulation rate.
27.07.2005	Took slow circulation rate. Drilled 14 3/4" hole from 2419 m to 2477 m. Took MWD finger print. Drilled 14 3/4" hole from 2477 m to 2506 m. Increased MW to 1.30 sg. Drilled 14 3/4" hole from 2506 m to 2674 m. Circulated hole clean. Drilled 14 3/4" hole from 2674 m to 2728 m.
28.07.2005	Drilled 14 3/4" hole from 2728 m to 2937 m. Increased MW from 1.30 sg to 1.33 sg. Drilled 14 3/4" hole from 2937 m to 3039 m.
29.07.2005	Drilled 14 3/4" hole to TD at 3046 m. Circulated hole clean and weighed up mud to 1.37 sg. POOH to 2881 m. RIH to bottom due to tight hole. Circulated bottoms up. Back reamed to 2680 m. Circulated hole clean. Continued back reaming into 16" liner shoe. Circulating hole clean.
30.07.2005	Circulated hole clean at 16" liner shoe. POOH and racked 14 3/4" BHA. RU and ran wireline toolstring to 2235 m MD - held up. POOH and LD wireline string. Trouble shot top drive rotating head assembly. MU and RIH with 14 3/4" x 17 1/2" UR BHA. RIH to 44 m.
31.07.2005	RIH with 14 3/4" x 17 1/2" UR BHA. Activated under reamer below the 16" liner. Under reamed 14 3/4" hole to 17 1/2" from 2380 m to 2659m.
01.08.2005	Under reamed 14 3/4" hole to 17 1/2". Circulated hole clean prior and flow checked to POOH for wireline logging.

Report date	Description
02.08.2005	POOH to 2894 m. Experienced tight hole. RIH to bottom, cback reamed to 2390 m. Circulated hole clean every 300 m back reamed. Established parameters, backreamed to clean out 16" liner with under reamer.
03.08.2005	Back reamed and cleaned out 16" liner. Circulated hole clean. POOH and racked BHA. RU and ran wireline logs run #1: 2355m to 3023m. RIH with WL run #2: 3023m to 1287m.
04.08.2005	Completed CSI logging. POOH, LD wireline string and RD wireline running gear. Redressed cement stand. Changed saver sub on top drive. MU and RIH MPT, engaged nominal bore protector. POOH to 1023 m.
05.08.2005	Recovered bore protector. RU and ran 13 3/8" casing to 1225m. Respooled drilling line on drawworks drum.
06.08.2005	Ran and landed 13 3/8" casing in WH. Cemented casing.
07.08.2005	Verified casing float valves holding. Set and pressure tested seal assembly. POOH and LD landing string in singles. LD 17 1/2" BHA from derrick. MU 12 1/4" BHA and racked in the derrick. Pressure tested top drive and surface circulatory system.
08.08.2005	Ran and set wear bushing. Pressure tested BOP. POOH and LD MPT. MU and RIH 12 1/4" BHA to 1025 m. Function tested MWD string. Pressure tested casing to 375 bar with 1.37 sg mud against upper shear ram. Pressure tested lower shear ram to 35 / 375 bar. RIH to 2380 m.
09.08.2005	RIH 12 1/4" BHA. Performed choke drill. Tagged float collar and drilled out shoe track while displacing well to 1.42 sg mud. Drilled 3 m new formation to 3049 m. Conditioned well, performed LOT. Performed flow fingerprinting. POOH for squeeze cementing.
10.08.2005	RIH 5½" mule shoe. Performed cement squeeze operations at 13 3/8" casing shoe. POOH, LD mule shoe. MU and RIH 12 1/4" BHa.

INTERVAL: 12 1/4"
START TIME: 11.08.2005 05:00
END TIME: 25.08.2005 22:00

Report date	Description
11.08.2005	RIH 12 1/4" BHA: Tagged and drilled out cement in casing and open hole and drilled 3 m new formation to 3052 m while cutting mud weight to 1.40 sg. Circulated hole clean, performed FIT to 1.49 sg. Drilled 12 1/4" hole to 3060 m.
12.08.2005	Drilled 12 1/4" hole to 3151 m. Circulated hole clean. POOH into 13 3/8" casing. Perfromed FIT to 1.49 sg EMW. Drilled 12 1/4" hole to 3202 m. Circulated out gas peak and connection to evaluate pore pressure. Drilled 12 1/4" hole to 3212 m.
13.08.2005	Drilled 12 1/4" hole from 3212 m to 3518 m.
14.08.2005	Drilled 12 1/4" hole from 3518 m to 3688 m.
15.08.2005	Drilled 12 1/4" hole to section TD at 3839 m. Circulated bottoms up. POOH from TD to 3790 m.
16.08.2005	POOH to 3777 m. RIH to TD. Circulated bottoms up. Back reamed to 13 3/8" shoe. RIH to TD at 3839 m. Drilled 3 m new formation to 3842 m. Circulated bottoms up. POOH to 3645 m.
17.08.2005	POOH and racked back 12 1/4" BHA. RU and ran wireline toolstring #1. String hung up at 2680 m. Attempted to work string through, no go. POOH and LD logging tools. RIH 12 1/2" BHA for wipertrip to 823 m.
18.08.2005	RIH 12 1/4" BHA (wiper trip prior to logging) to TD at 3842 m. Circulated bottoms up. POOH into 13 3/8" shoe at 3035. Back reamed 13 3/8" casing from 3035 m to 2000 m. Circulated bottoms up. POOH to 1900 m.
19.08.2005	POOH 12 1/4" BHA. Ran wire line toolstring #- 1- PEX. Had shutdown on rig, meanwhile prepared tool string #2. Ran wire line toolstring #2- MSCT. Took side walls cores from 3436.5 m to 3610 m.
20.08.2005	Ran MSCT log. Ran 9 5/8" liner. Changed to 5 1/2" handling equipment. Install liner hanger. LD liner handling equipment.
21.08.2005	Ran in and set liner shoe at 3841m. Circulated condition hole. Activated hanger. Circulated hole. Pump and displaced cement. Activated TST packer. Circulated bottoms up.
22.08.2005	Circulatet bottoms up. POOH. Pressure tested BOP. LD 12 1/4" BHA.
23.08.2005	LD 12 1/4" BHA. Changed wash pipe. Pressure tested DDM accessories. MU and function tested MWD for 8 1/2" section. Re- tested BOP.
24.08.2005	POOH BOP testing tool. MU 8 1/2" BHA. RIH and PU 84 jt 5" DP on way in. Pressure tested 9 5/8" liner and shear rams. RIH 8 1/2" BHA to 2050 m. Performed kick drill.

Report date	Description
25.08.2005	Perfoemed Kick/ choke drill. RIH and tagged float collar at 3799.5 m. Performed kick/ choke drill. Had difficulties to record reasonable pressure readings. Circulated and condition mud. Performed kick/ choke drill. Took fingerprints as per procedure. Drilled shoe track from 3799.5 m to 3830 m. Repaired choke B. Meanwhile circulate condition mud.

INTERVAL: 8 1/2"
START TIME: 25.08.2005 22:00
END TIME: 23.09.2005 03:00

Report date	Description
26.08.2005	Repaired choke B. Drilled cement. Tighten up wash pipe. Drilled shoe and 3 m new formation. Performed LOT to 1.72 sg equivalent MW. Reamed and cleaned hole. Displaced hole to 1.47 sg WBM. Conditiated mud.
27.08.2005	Conditioned mud. Drilled 8 1/2" hole from 3845 m to 3903 m with drilling break at 3899 m. Observed well. Circulated well. Increased MW from 1.47 sg to 1.49 sg. Performed 5 stands short trip.
28.08.2005	Performed 5 std's short trip. Circulated BU. Circulated out swabbed gas. Increased MW from 1.49 sg to 1.54 sg. Performed 5 std's short trip.
29.08.2005	Circulated BU after 5 std's short trip. Pumped out of hole with 8 1/2" BHA from 3903 m to 2945 m. POOH with 8 1/2" BHA from 2945 m to 25 m.
30.08.2005	Racked back 8 1/2" BHA. MU and RIH to 2910 m with coring assembly. Function tested BOP. WOW to cut core.
31.08.2005	WOW to cut core. RIH to 3903 m with coring assembly. Circulated BU through choke line. Increased MW from 1.54 sg to 1.56 sg.
01.09.2005	Cored interval from 3903 m to 3911 m. Core jammed off. Pumped out off hole to above 9 5/8" liner top at 2965 m. POOH from 2950 m to 2190 m.
02.09.2005	POOH with 8 1/2" coring assembly. LD 7.9 m recovered core. MU new coring assembly and RIH to 3900 mm
03.09.2005	Core intervall from 3911 m to 3918 m. Core jammed off. Pumped out of hole to above 9 5/8" liner top at 2965 m. POOH with 8 1/2" coring assembly from 2950 m to 2348 m.
04.09.2005	POOH with 8 1/2" coring assembly and racked back same. LD core barrel. Evaluated core samples. Repaired iron roughneck and Hydraracker. PU and MU new 8 1/2" BHA and RIH to 80 m.
05.09.2005	MU and RIH with 8 1/2" BHA to 3895 m. Circulated BU while adding Glydril deep water brine. Reamed down and drilled 8 1/2" hole from 3918 m to 3936 m. Performed 10 - 10 - 10 pump cycle test. Circulated BU.
06.09.2005	Performed 2 std's pull test. Circulated BU. Pumped out of hole with 8 1/2" BHA from 3936 m to 2945 m. POOH with 8 1/2" BHA from 2945 m to 240 m. Racked back 8 1/2" BHA. MU 8 1/2" coring assembly and RIH to 751 m.
07.09.2005	RIH with 8 1/2" coring assembly. Circulated BU. Commenced coring from 3936 m to 3941.5 m. Core jammed of at 3941.5 m. Performed 5 std's pull test. Circulated BU.
08.09.2005	Pump and POOH with 8 1/2" coring assembly. LD core barrel. Redressed and racked back 8 1/2" coring assembly. MU BOP test tool and RIH to 1260 m.
09.09.2005	Pressure tested BOP except LPR to 35 bar / 390 bar. POOH and reconfigured BOP test assembly. RIH and pressure tested LPR to 35 bar / 390 bar. POOH, LD test plug. LD mouse hole. Pressure tested top drive IBOPs and circulating hose to 345 bar. No test on upper IBOP. Replaced upper IBOP.
10.09.2005	Changed upper IBOP, pressure tested IBOP. MU 8½" BHA, RIH to BOP. Slipped and cut drill line. RIH to 3895 m. Washed down and logged cored section. Shut-in well due to gain while logging. Circulated riser volume with booster line against closed UAP and diverter.
11.09.2005	Circulated out riser through degasser. Bled off pressure on BOP. Circulated out well. Opened BOP, drilled 8½" hole to 3965 m. Circulated bottoms up. Drilled 8½" hole to 3996 m.
12.09.2005	Drilled 8½" hole from 3996 m to 4048 m.
13.09.2005	Drilled 8½" hole from 4048 m to 4123 m.
14.09.2005	Drilled 8½" hole from 4123 m to 4188 m.
15.09.2005	Drilled 8½" hole to 4230 m (TD). Circulated bottoms up into 9 5/8" liner, pumped OOH to 9 5/8" liner, back reamed to 3187 m.
16.09.2005	Back reamed out of 9 5/8" liner. Circulated bottoms up, POOH to surface. LD MWD and core barrel. Cleared the drill floor, serviced top drive. Rigged up and ran wireline logs BHA #1: CMR+. Log down to 4230 m.

Report date	Description
18.09.2005	Ran wireline log #3 MDT. Took pressure points and fluid samples. POOH, LD MDT. Trouble shot and rebuilt electric logging cable head. Trouble shot MSCT power supply diesel generator.
19.09.2005	MU and RIH wireline run #4 MSCT. Observed alarm on hydraulic system. POOH MSCT, trouble shot hydraulic oil low pressure alarm. RIH MSCT, took 51 sidewall cores. POOH, LD MSCT string. MU and RIH wireline run #5 MDT. Took formation fluid samples at 3937 m.
20.09.2005	Ran wireline logging run #5 MDT. Performed fluid sampling at 3937 m. POOH, LD MDT. MU and RIH wireline logging run #6 MSCT. Took 41 sidewall cores from 4218.5 m to 3864 m. POOH to surface.
21.09.2005	LD wireline logging run #6 MSCT. MU and RIH wireline logging run #7 CSI for VSP, deployed air guns. Experienced telemetry problems. POOH, trouble shot and redressed cable head. RIH, logged VSP. POOH, LD CSI string. MU wireline logging run #8 dual packer MDT string.
22.09.2005	Rigged up wireline logging run #8. Experienced problems during function test. Trouble shot, rebuilt cable head and changed telemetry cartridge. RIH, correlated depth, inflated packers and flushed tool prior to sampling.

INTERVAL: PERM P&A
START TIME: 23.09.2005 03:00
END TIME: 07.10.2005 07:00

Report date	Description
23.09.2005	Performed wireline logging run #8. Took formation fluid samples. POOH, LD wireline toolstring. RD wireline logging gear. PU and MU 3½" cement stinger. RIH to 301 m.
24.09.2005	RIH 3 1/2" cement stinger to 4230 m. Circulated bottoms up. Flow checked well static. Pressure tested surface cementing lines. Set and displaced balanced cement plug #1from 4230 m to 3950 m. POOH to 3922 m. Circulated hole prior to set balanced cement #2.
25.09.2005	Circulated bottoms up at 3940 m. Set balanced cement plug from 3940 m to 3680 m. POOH from 3940 m to 3660 m. Circulated bottoms up. POOH from 3660 m to 3400 m. Washed setting area for EZSV plug and circulated bottoms up. POOH. MU 9 5/8" EZSV plug and RIH to 1285 m. Meanwhile pressure tested cement plug to 135 bar/ 15 min.
26.09.2005	RIH and set EZSV plug at 3398 m. Circulated bottoms up. Pressure tested plug to 135 bar. Set balanced plug #3 from 3398m to 3150 m. Circulated bottoms up. Set balanced plug #4 from 3140 m to 2890 m. POOH to 2772 m. Circulated one string volume. POOH to 2070 m. Cut mud weight from 1.56 sg to 1.37 sg. POOH to 1505 m.
27.09.2005	POOH 9 5/8" EZSV running tool from 1504 m to surface. MU and RIH 13 3/8" casing cutting assembly. RIH to 2069.3 m and cut 13 3/8" casing. Flow checked well static. POOH to 1747 m. Repaired Iron Roughneck. POOH to 1502 m. Secured mouse hole in moonpool and on rig floor. Continued POOH to surface.
28.09.2005	LD casing cutter assembly. Laid out mouse hole. Retreived wearbusing. MU, RIH and latched 13 3/8" casing. Flow checked well static. Circulated bottoms up. POOH 13 3/8" casing on 5 1/2" DP to 670 m.
29.09.2005	POOH 13 3/8" casing on 5 1/2" DP from 670 m to surface. Disengaged 13 3/8" casing spear and LD spear assembly. POOH and laid down 13 3/8" casing. LD 13 3/8" casing handling equipment. MU and RIH 16" EZSV to 1611 m.
30.09.2005	RIH and sat 16" EZSV plug at 2050 m. Sat balanced cement plug from 2050 m to 1780 m. Displaced well to seawater. Sat hi- vis pill from 1770 m to 1550 m. Sat balanced cement plug from 1550 m to 1320 m. POOH to 1290 m. Circulated bottoms up. Circulated through BOP. LD 5 1/2" DP.
01.10.2005	POOH and lD 5 1/2" DP and EZSV running tool. LD DP and HWDP from derrick. LD marine and annular swivil. Broke and LD hang off stand. LD DC`s. RU riser handling equipment.
02.10.2005	RU riser handling equipment. WOW. Disconnected BOP at 22:50 hrs. Installed safety slings onto support ring. Disconnected kill/ choke/ boost lines from goose necks. Removed goose necks.
03.10.2005	Pressurized LMRP to 5000 psi. Disconnected both conduit lines. Secured support ring. LD landing joint and slip joint. Pulled BOP and LD risers to 1097. Lost pressure on accumulator bottles. Re- pressurized acc. bottles. LD risers to 617 m. Re- pressurized acc. bottes. LD risers to 388 m. (17 riser joints to go)
04.10.2005	Pulled BOP and LD risers. Pulled BOP through splash zone @ 12:100 hrs. Sat BOP on trolly. Disconnected BOP from riser. Skidded BOP to parking position. LD double riser joints. LD riser handling equipment. Rigged up drilling equipment to commencing P & A operation on U-1.
06.10.2005	Cut and retreive wellhead on 6302/6-1.

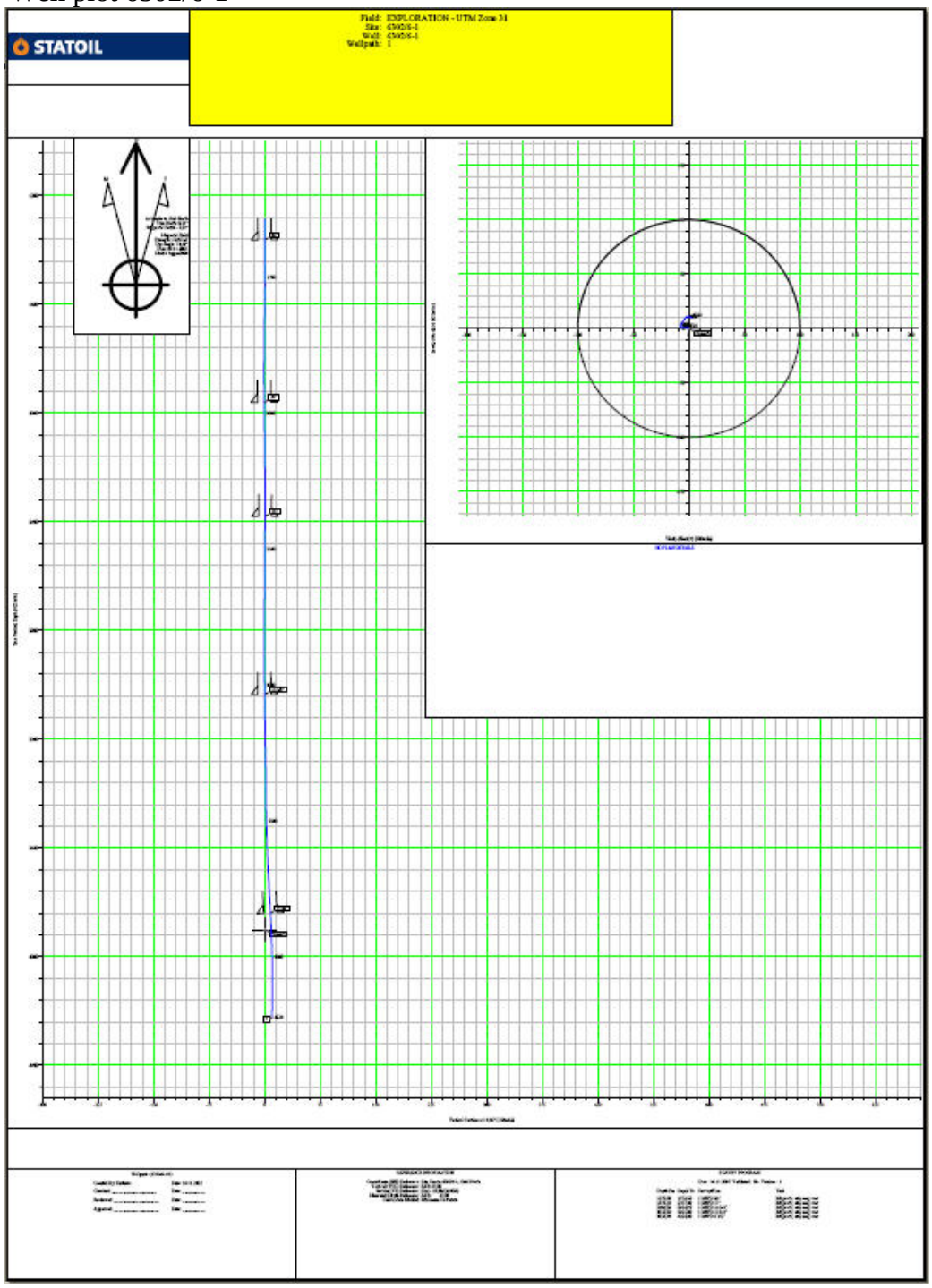
Report date	Description
07.10.2005	LD MOST tool and cleaned rig floor. Cleared seabed with ROV. Performed seabed survey and retrieved transponders. Deballasted rig to transit draft.

WELLBORE ID: NO 6302/6-U-1
INTERVAL: PERM P&A
START TIME: 03.10.2005 22:00
END TIME: 05.10.2005 11:30

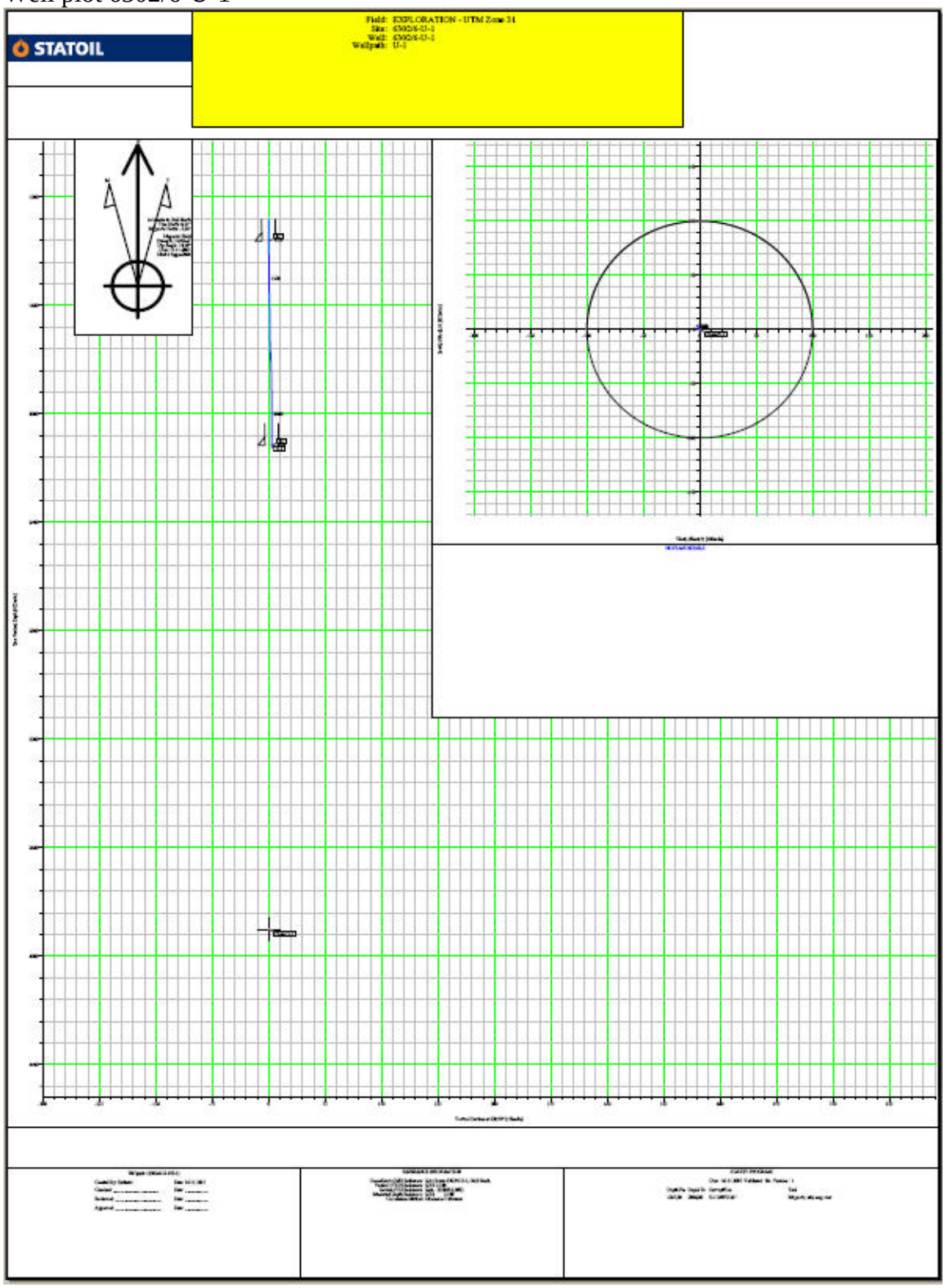
Report date	Description
04.10.2005	MU and RIH to 2084 m with cement diverting tool. Circulated BU prior to setting balanced cement plug from 2084 m to 1880 m.
05.10.2005	Sat balanced cement plug from 2084 m to 1884 m and from 1550 m to 1346 m. Cut and retrieved 20" x 36" casing.

App B Directional data, survey listing

Well plot 6302/6-1



Well plot 6302/6-U-1



Survey listing for Well: 6302/6-1

Baker Hughes Incorporated
Survey Report

Company:	STATOIL - Norway	**Date:**	04/1111/2005	**Time:**	13:52:33 **Page:** 1
Field:	EXPLORATION - UTM Zone 31	**Co-ordinate(NE) Reference:**	Well: 6302/6-1 (Tulipan), Grid North		
Site:	6302/6-1	**Vertical (TVD) Reference:**	SITE 25.0		
Well:	6302/6-1 (Tulipan)	**Section (VS) Reference:**	Well (0.00N,0.00E,16.13Azi)		
Wellpath:	1	**Survey Calculation Method:**	Minimum Curvature	**Db:**	Oracle

Field:	EXPLORATION - UTM Zone 31		
	Norway		
Map System:	Universal Transverse Mercator	**Map Zone:**	UTM Zone 31, North 0 to 6E
Geo Datum:	ED50 (International 1924)	**Coordinate System:**	Well Centre
Sys Datum:	Mean Sea Level	**Geomagnetic Model:**	bggm2005

Site:	6302/6-1							
Site Position:		**Northing:**	7044540.65 m	**Latitude:**	63	31	38.430	N
From:	Geographic	**Easting:**	486277.59 m	**Longitude:**	2	45	51.560	E
Position Uncertainty:	0.00 m			**North Reference:**			Grid	
Water Depth:	1260.50 m			**Grid Convergence:**			-0.21	deg

Well:	6302/6-1 (Tulipan)			**Slot Name:**				
Surface Position:	+N/-S 0.00 m	**Northing:**	7044540.65 m	**Latitude:**	63	31	38.430	N
	+E/-W 0.00 m	**Easting:**	486277.59 m	**Longitude:**	2	45	51.560	E
Position Uncertainty:	0.00 m							
Reference Point:	+N/-S 0.00 m	**Northing:**	7044540.65 m	**Latitude:**	63	31	38.430	N
	+E/-W 0.00 m	**Easting:**	486277.59 m	**Longitude:**	2	45	51.560	E
		Measured Depth:	1285.50 m	**Inclination:**			0.00	deg
		Vertical Depth:	1285.50 m	**Azimuth:**			0.00	deg

Wellpath:	1		**Drilled From:**	Well Ref. Point	
			Tie-on Depth:	1285.50 m	
Current Datum:	SITE	**Height** 25.00 m	**Above System Datum:**	Mean Sea Level	
Magnetic Data:	04/1111/2005		**Declination:**	0.00	deg
Field Strength:	0 nT		**Mag Dip Angle:**	0.00	deg

Vertical Section:	**Depth From (TVD)** m	**+N/-S** m	**+E/-W** m	**Direction** deg
	1285.50	0.00	0.00	16.13

Survey Program for Definitive Wellpath
Date: 04/1111/2005 **Validated:** No **Version:** 1

Actual From m	**To** m	**Survey**	**Toolcode**	**Tool Name**
1370.00	1952.50	1-BHI.MWD 26" hole (1370.00-19	Magnetic, std, mag-corr	Magnetic Tools (MWD, EMS)
1976.10	2377.40	1-BHI.MWD 17" hole (1976.10-23	Magnetic, std, mag-corr	Magnetic Tools (MWD, EMS)
2404.30	3034.90	1-BHI.MWD 14 3/4" hole (2404.3	Magnetic, std, mag-corr	Magnetic Tools (MWD, EMS)
3058.80	3825.60	1-BHI-MWD 12 1/4" hole (3058.8	Magnetic, std, mag-corr	Magnetic Tools (MWD, EMS)
3856.40	4224.40	1-BHI-MWD 8 1/2" hole (3856.40	Magnetic, std, mag-corr	Magnetic Tools (MWD, EMS)

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
1285.50	0.00	0.00	1285.50	0.00	0.00	0.00	0.000	0.000	0.000	TIE LINE
1370.00	0.33	301.72	1370.00	0.13	-0.21	0.07	0.117	0.117	0.000	Magnetic, std, mag-corr
1399.20	0.33	349.51	1399.20	0.25	-0.29	0.16	0.275	0.000	49.099	Magnetic, std, mag-corr
1428.30	0.42	263.49	1428.30	0.36	-0.41	0.23	0.428	0.093	-68.062	Magnetic, std, mag-corr
1455.70	0.21	285.01	1455.70	0.40	-0.56	0.23	0.230	-0.230	1.664	Magnetic, std, mag-corr
1484.40	0.38	316.55	1484.40	0.48	-0.68	0.27	0.239	0.178	32.969	Magnetic, std, mag-corr
1512.40	0.90	290.37	1512.40	0.63	-0.95	0.34	0.625	0.557	-26.050	Magnetic, std, mag-corr
1541.30	0.78	280.37	1541.29	0.74	-1.35	0.34	0.196	-0.125	-10.381	Magnetic, std, mag-corr
1570.00	1.05	278.02	1569.99	0.81	-1.80	0.28	0.285	0.282	-2.456	Magnetic, std, mag-corr
1598.50	0.88	250.89	1598.49	0.78	-2.27	0.12	0.507	-0.179	-28.558	Magnetic, std, mag-corr
1628.90	0.46	253.46	1628.88	0.67	-2.61	-0.09	0.415	-0.414	2.536	Magnetic, std, mag-corr
1657.30	0.94	254.84	1657.28	0.57	-2.94	-0.27	0.507	0.507	1.458	Magnetic, std, mag-corr
1686.60	0.94	275.85	1686.58	0.53	-3.41	-0.44	0.351	0.000	21.512	Magnetic, std, mag-corr
1715.70	0.75	263.27	1715.67	0.54	-3.84	-0.55	0.273	-0.196	-12.969	Magnetic, std, mag-corr
1743.90	1.08	279.80	1743.87	0.56	-4.28	-0.65	0.446	0.351	17.585	Magnetic, std, mag-corr
1773.30	1.24	291.53	1773.25	0.72	-4.85	-0.65	0.291	0.163	11.969	Magnetic, std, mag-corr
1802.10	1.12	264.83	1802.06	0.81	-5.42	-0.73	0.560	-0.125	-27.812	Magnetic, std, mag-corr
1830.70	0.59	261.17	1830.66	0.76	-5.85	-0.89	0.559	-0.556	-3.839	Magnetic, std, mag-corr
1859.20	0.39	331.25	1859.15	0.83	-6.04	-0.88	0.617	-0.211	73.768	Magnetic, std, mag-corr
1887.90	0.66	289.71	1887.85	0.97	-6.24	-0.80	0.470	0.282	-43.422	Magnetic, std, mag-corr
1917.00	0.59	293.99	1916.95	1.09	-6.54	-0.77	0.067	-0.072	4.412	Magnetic, std, mag-corr

Baker Hughes Incorporated
Survey Report

Company:	STATOIL - Norway	**Date:** 04/1111/2005 **Time:** 13:52:33	**Page:** 2
Field:	EXPLORATION - UTM Zone 31	**Co-ordinate(NE) Reference:**	Well: 6302/6-1 (Tulipan), Grid North
Site:	6302/6-1	**Vertical (TVD) Reference:**	SITE 25.0
Well:	6302/6-1 (Tulipan)	**Section (VS) Reference:**	Well (0.00N,0.00E,16.13Azi)
Wellpath:	1	**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
1945.90	0.48	307.75	1945.85	1.22	-6.77	-0.71	0.175	-0.114	14.284	Magnetic, std, mag-corr
1952.50	0.66	296.39	1952.45	1.25	-6.82	-0.69	0.962	0.818	-51.636	Magnetic, std, mag-corr
1976.10	0.42	289.44	1976.05	1.34	-7.03	-0.66	0.316	-0.305	-6.835	Magnetic, std, mag-corr
2004.60	0.45	340.23	2004.55	1.48	-7.16	-0.57	0.394	0.032	53.463	Magnetic, std, mag-corr
2030.60	0.24	306.31	2030.75	1.61	-7.24	-0.46	0.326	-0.240	-36.840	Magnetic, std, mag-corr
2059.60	0.41	3.91	2059.75	1.75	-7.28	-0.34	0.359	0.176	59.586	Magnetic, std, mag-corr
2091.60	0.33	7.03	2091.55	1.96	-7.27	-0.14	0.078	-0.075	2.943	Magnetic, std, mag-corr
2121.10	0.08	40.86	2121.05	2.06	-7.24	-0.04	0.272	-0.254	34.403	Magnetic, std, mag-corr
2149.70	0.30	328.98	2149.65	2.14	-7.27	0.03	0.299	0.231	-75.399	Magnetic, std, mag-corr
2177.20	0.31	322.13	2177.15	2.26	-7.35	0.13	0.041	0.011	-7.473	Magnetic, std, mag-corr
2208.10	0.15	313.74	2208.05	2.35	-7.43	0.19	0.158	-0.155	-8.146	Magnetic, std, mag-corr
2235.70	0.12	49.66	2235.65	2.39	-7.43	0.23	0.219	-0.033	104.261	Magnetic, std, mag-corr
2264.50	0.05	234.38	2264.45	2.41	-7.42	0.25	0.177	-0.073	-182.583	Magnetic, std, mag-corr
2293.20	0.24	297.39	2293.15	2.43	-7.48	0.25	0.232	0.199	65.864	Magnetic, std, mag-corr
2321.80	0.33	334.09	2321.75	2.53	-7.57	0.32	0.208	0.094	38.497	Magnetic, std, mag-corr
2350.80	0.15	52.35	2350.74	2.63	-7.58	0.42	0.345	-0.186	80.959	Magnetic, std, mag-corr
2377.40	0.26	237.52	2377.34	2.61	-7.60	0.40	0.462	0.124	-197.177	Magnetic, std, mag-corr
2404.30	0.29	156.37	2404.24	2.52	-7.63	0.30	0.400	0.033	-90.502	Magnetic, std, mag-corr
2436.20	0.38	194.79	2436.14	2.34	-7.62	0.13	0.222	0.065	36.132	Magnetic, std, mag-corr
2465.40	0.32	218.74	2465.34	2.19	-7.70	-0.04	0.161	-0.062	24.606	Magnetic, std, mag-corr
2494.90	0.17	221.46	2494.84	2.09	-7.78	-0.15	0.153	-0.153	2.766	Magnetic, std, mag-corr
2522.50	0.02	145.73	2522.44	2.05	-7.80	-0.19	0.181	-0.163	-82.315	Magnetic, std, mag-corr
2551.30	0.11	94.06	2551.24	2.05	-7.77	-0.19	0.103	0.094	-53.823	Magnetic, std, mag-corr
2577.20	0.05	133.31	2577.14	2.04	-7.74	-0.19	0.090	-0.069	45.463	Magnetic, std, mag-corr
2605.70	0.13	126.62	2605.64	2.01	-7.70	-0.21	0.085	0.084	-7.042	Magnetic, std, mag-corr
2635.10	0.09	99.69	2635.04	1.99	-7.66	-0.22	0.066	-0.041	-27.480	Magnetic, std, mag-corr
2665.80	0.18	183.81	2665.74	1.94	-7.63	-0.26	0.188	0.088	82.202	Magnetic, std, mag-corr
2724.80	0.07	271.47	2724.74	1.84	-7.68	-0.36	0.097	-0.056	44.573	Magnetic, std, mag-corr
2752.00	0.18	153.19	2751.94	1.81	-7.67	-0.40	0.245	0.121	-130.456	Magnetic, std, mag-corr
2781.20	0.33	247.76	2781.14	1.73	-7.73	-0.48	0.399	0.154	97.161	Magnetic, std, mag-corr
2810.60	0.34	235.18	2810.54	1.65	-7.88	-0.60	0.076	0.010	-12.837	Magnetic, std, mag-corr
2838.60	0.05	206.41	2838.54	1.59	-7.96	-0.68	0.318	-0.311	-30.825	Magnetic, std, mag-corr
2868.30	0.17	66.54	2868.24	1.60	-7.92	-0.66	0.213	0.121	-141.263	Magnetic, std, mag-corr
2897.00	0.19	56.52	2896.94	1.64	-7.84	-0.60	0.039	0.021	-10.474	Magnetic, std, mag-corr
2925.00	0.30	40.07	2924.94	1.72	-7.76	-0.50	0.139	0.118	-17.625	Magnetic, std, mag-corr
2953.30	0.13	35.45	2953.24	1.81	-7.69	-0.40	0.181	-0.180	-4.898	Magnetic, std, mag-corr
2981.30	0.24	60.87	2981.24	1.84	-7.61	-0.35	0.188	0.118	48.664	Magnetic, std, mag-corr
3011.40	0.23	99.73	3011.34	1.84	-7.49	-0.31	0.077	-0.010	18.797	Magnetic, std, mag-corr
3034.90	0.20	72.77	3034.84	1.85	-7.41	-0.28	0.133	-0.038	-34.417	Magnetic, std, mag-corr
3058.60	0.27	341.23	3058.74	1.91	-7.38	-0.22	0.427	0.068	-114.904	Magnetic, std, mag-corr
3115.60	0.42	11.66	3115.54	2.24	-7.38	0.10	0.122	0.079	16.072	Magnetic, std, mag-corr
3172.10	0.20	332.97	3172.04	2.53	-7.39	0.38	0.155	-0.117	-20.543	Magnetic, std, mag-corr
3201.60	0.35	6.41	3201.74	2.67	-7.40	0.51	0.216	0.152	33.778	Magnetic, std, mag-corr
3231.40	0.42	0.42	3231.34	2.87	-7.39	0.70	0.082	0.071	-6.071	Magnetic, std, mag-corr
3260.50	0.53	351.97	3260.44	3.11	-7.41	0.93	0.134	0.113	-8.711	Magnetic, std, mag-corr
3287.50	0.47	338.66	3287.44	3.33	-7.47	1.13	0.145	-0.067	-14.789	Magnetic, std, mag-corr
3316.60	0.47	3.44	3316.53	3.56	-7.50	1.34	0.208	0.000	25.546	Magnetic, std, mag-corr
3343.50	0.02	20.06	3343.43	3.68	-7.49	1.45	0.503	-0.502	18.535	Magnetic, std, mag-corr
3374.60	0.14	65.98	3374.73	3.70	-7.46	1.48	0.122	0.115	44.013	Magnetic, std, mag-corr
3403.20	0.20	59.03	3403.13	3.74	-7.38	1.54	0.067	0.063	-7.342	Magnetic, std, mag-corr
3432.10	0.21	30.96	3432.03	3.81	-7.31	1.63	0.104	0.010	-29.138	Magnetic, std, mag-corr
3461.60	0.51	45.51	3461.53	3.95	-7.19	1.80	0.317	0.305	14.797	Magnetic, std, mag-corr
3489.80	0.36	45.44	3489.73	4.10	-7.04	1.98	0.160	-0.160	-0.074	Magnetic, std, mag-corr
3519.40	0.75	35.84	3519.33	4.32	-6.86	2.25	0.405	0.395	-9.730	Magnetic, std, mag-corr
3545.70	0.80	34.11	3545.63	4.61	-6.66	2.58	0.063	0.057	-1.973	Magnetic, std, mag-corr
3574.30	0.76	34.91	3574.23	4.93	-6.43	2.95	0.043	-0.042	0.839	Magnetic, std, mag-corr
3606.40	1.04	38.69	3606.32	5.34	-6.13	3.42	0.267	0.262	3.533	Magnetic, std, mag-corr
3663.20	1.04	35.74	3663.11	6.16	-5.51	4.38	0.028	0.000	-1.558	Magnetic, std, mag-corr
3719.90	1.12	31.27	3719.80	7.05	-4.92	5.40	0.061	0.042	-2.365	Magnetic, std, mag-corr

Baker Hughes Incorporated
Survey Report

Company:	STATOIL - Norway	**Date:** 04/1111/2005 **Time:** 13:52:33	**Page:** 3
Field:	EXPLORATION - UTM Zone 31	**Co-ordinate(NE) Reference:**	Well: 6302/6-1 (Tulipan), Grid North
Site:	6302/6-1	**Vertical (TVD) Reference:**	SITE 25.0
Well:	6302/6-1 (Tulipan)	**Section (VS) Reference:**	Well (0.00N,0.00E,16.13Azi)
Wellpath:	1	**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
3747.60	0.96	29.41	3747.70	7.48	-4.66	5.89	0.176	-0.172	-2.000	Magnetic, std, mag-corr
3807.90	1.35	35.02	3807.79	8.50	-4.01	7.05	0.202	0.195	2.800	Magnetic, std, mag-corr
3825.60	1.30	38.04	3825.68	8.84	-3.76	7.44	0.144	-0.084	5.061	Magnetic, std, mag-corr
3856.40	1.20	32.14	3856.27	9.38	-3.38	8.07	0.160	-0.098	-5.764	Magnetic, std, mag-corr
3887.30	1.10	37.10	3887.17	9.89	-3.03	8.66	0.137	-0.097	4.816	Magnetic, std, mag-corr
3914.70	1.00	46.36	3914.56	10.27	-2.70	9.11	0.215	-0.109	10.139	Magnetic, std, mag-corr
3916.20	1.07	44.91	3916.06	10.28	-2.68	9.14	1.495	1.400	-29.000	Magnetic, std, mag-corr
3942.70	0.76	50.72	3942.56	10.57	-2.37	9.50	0.366	-0.351	6.577	Magnetic, std, mag-corr
3972.60	0.82	46.64	3972.46	10.84	-2.06	9.85	0.062	0.060	-4.094	Magnetic, std, mag-corr
4000.80	0.79	38.33	4000.65	11.13	-1.79	10.20	0.128	-0.032	-8.840	Magnetic, std, mag-corr
4030.50	0.46	118.49	4030.35	11.24	-1.56	10.36	0.852	-0.333	80.970	Magnetic, std, mag-corr
4059.40	0.80	100.99	4059.25	11.14	-1.26	10.36	0.402	0.353	-18.166	Magnetic, std, mag-corr
4088.00	0.86	109.73	4087.85	11.03	-0.86	10.36	0.147	0.063	9.168	Magnetic, std, mag-corr
4112.20	1.02	97.62	4112.04	10.94	-0.48	10.38	0.315	0.198	-15.012	Magnetic, std, mag-corr
4142.30	1.14	98.82	4142.14	10.86	0.09	10.46	0.122	0.120	1.196	Magnetic, std, mag-corr
4172.00	1.67	117.64	4171.83	10.62	0.76	10.41	0.703	0.535	19.010	Magnetic, std, mag-corr
4196.60	2.18	118.15	4196.42	10.23	1.49	10.24	0.622	0.622	0.622	Magnetic, std, mag-corr
4224.40	2.67	116.98	4224.19	9.69	2.53	10.01	0.531	0.529	-1.263	Magnetic, std, mag-corr
4230.00	2.67	116.98	4229.79	9.57	2.77	9.96	0.000	0.000	0.000	

Survey listning for Well 6302/6-U-1

Statoil
Survey Report - Geographic

Company:	STATOIL - Norway	**Date:**	16.11.2005	**Time:**	10:22:40 **Page:** 1
Field:	EXPLORATION - UTM Zone 31	**Co-ordinate(NE) Reference:**	Site: 6302/6-U-1, Grid North		
Site:	6302/6-U-1	**Vertical (TVD) Reference:**	SITE 25,0		
Well:	6302/6-U-1	**Section (VS) Reference:**	Well (0,00N,0,00E,330,90Azi)		
Wellpath:	U-1	**Survey Calculation Method:**	Minimum Curvature	**Db:**	Oracle

Field: EXPLORATION - UTM Zone 31

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:**	bggm2004

Site: 6302/6-U-1
6302

Site Position:		**Northing:**	7044597,51 m	**Latitude:**	63 31 40,270 N
From:	Geographic	**Easting:**	486305,30 m	**Longitude:**	2 45 53,550 E
Position Uncertainty:	0,00 m			**North Reference:**	Grid
Water Depth:	1260,50 m			**Grid Convergence:**	-0,2 deg

Well: 6302/6-U-1 **Slot Name:**

Surface Position:	**+N/-S**	0,00 m	**Northing:**	7044597,51 m	**Latitude:**	63 31 40,270 N
	+E/-W	0,00 m	**Easting :**	486305,30 m	**Longitude:**	2 45 53,550 E
Position Uncertainty:		0,00 m				
Reference Point:	**+N/-S**	0,00 m	**Northing:**	7044597,51 m	**Latitude:**	63 31 40,270 N
	+E/-W	0,00 m	**Easting :**	486305,30 m	**Longitude:**	2 45 53,550 E
			Measured Depth:	1285,50 m	**Inclination:**	0,0 deg
			Vertical Depth:	1285,50 m	**Azimuth :**	0,0 deg

Wellpath: U-1

Current Datum:	SITE	**Height**	25,00 m	**Above System Datum:**	Mean Sea Level
Magnetic Data:	11.11.2005			**Declination:**	-3,0 deg
Field Strength:	51408 nT			**Mag Dip Angle:**	74,7 deg

Vertical Section:	**Depth From (TVD)** m	**+N/-S** m	**+E/-W** m	**Direction** deg
	1285,50	0,00	0,00	330,9

Survey Program for Definitive Wellpath
Date: 16.11.2005 **Validated:** No **Version:** 1

Actual From m	**To** m	**Survey**	**Toolcode**	**Tool Name**
1367,00	2086,80	U-1 MWD 26" (1367,00-2086,80)	Magnetic, std, mag-corr	Magnetic Tools (MWD, EMS)

Survey

MD m	**Incl** deg	**Azim** deg	**TVD** m	**+N/-S** m	**+E/-W** m	**Map Northing** m	**Map Easting** m	**<--- Latitude --->** Deg Min Sec	**<--- Longitude --->** Deg Min Sec
1285,50	0,0	0,0	1285,50	0,00	0,00	7044597,51	486305,30	63 31 40,270 N	2 45 53,550 E
1367,00	0,2	342,0	1367,00	0,14	-0,04	7044597,64	486305,25	63 31 40,274 N	2 45 53,547 E
1396,90	0,3	324,6	1396,90	0,25	-0,11	7044597,76	486305,19	63 31 40,278 N	2 45 53,542 E
1425,90	0,2	308,4	1425,90	0,35	-0,20	7044597,86	486305,10	63 31 40,281 N	2 45 53,535 E
1454,60	0,4	278,6	1454,60	0,40	-0,34	7044597,91	486304,95	63 31 40,283 N	2 45 53,525 E
1483,10	0,4	231,6	1483,10	0,35	-0,51	7044597,86	486304,78	63 31 40,281 N	2 45 53,513 E
1512,10	0,5	299,8	1512,10	0,35	-0,70	7044597,86	486304,59	63 31 40,281 N	2 45 53,499 E
1541,00	0,5	316,3	1541,00	0,50	-0,89	7044598,01	486304,40	63 31 40,286 N	2 45 53,485 E
1570,20	0,5	343,3	1570,20	0,71	-1,01	7044598,21	486304,28	63 31 40,293 N	2 45 53,476 E
1599,20	0,5	14,7	1599,19	0,94	-1,02	7044598,45	486304,27	63 31 40,300 N	2 45 53,476 E
1628,00	0,2	274,0	1627,99	1,06	-1,05	7044598,56	486304,24	63 31 40,304 N	2 45 53,474 E
1655,90	0,3	319,3	1655,89	1,11	-1,15	7044598,61	486304,14	63 31 40,306 N	2 45 53,466 E
1684,80	0,2	311,8	1684,79	1,19	-1,23	7044598,69	486304,07	63 31 40,308 N	2 45 53,461 E
1713,70	0,4	2,0	1713,69	1,33	-1,26	7044598,83	486304,04	63 31 40,313 N	2 45 53,459 E
1741,90	0,8	354,5	1741,89	1,64	-1,27	7044599,14	486304,02	63 31 40,323 N	2 45 53,457 E
1771,00	0,9	328,8	1770,99	2,04	-1,41	7044599,54	486303,89	63 31 40,336 N	2 45 53,447 E
1800,60	0,9	330,0	1800,58	2,43	-1,64	7044599,93	486303,66	63 31 40,348 N	2 45 53,431 E
1829,50	0,8	304,4	1829,48	2,73	-1,92	7044600,23	486303,38	63 31 40,358 N	2 45 53,411 E
1859,00	0,6	358,6	1858,98	3,01	-2,09	7044600,51	486303,21	63 31 40,367 N	2 45 53,398 E
1886,50	0,4	282,2	1886,48	3,18	-2,18	7044600,68	486303,12	63 31 40,372 N	2 45 53,392 E
1915,60	0,7	287,7	1915,58	3,25	-2,44	7044600,76	486302,86	63 31 40,375 N	2 45 53,373 E
1945,00	0,4	281,8	1944,98	3,33	-2,73	7044600,84	486302,57	63 31 40,377 N	2 45 53,352 E
1971,10	0,3	117,1	1971,08	3,32	-2,77	7044600,83	486302,53	63 31 40,377 N	2 45 53,349 E
1999,90	0,2	23,5	1999,88	3,35	-2,69	7044600,85	486302,61	63 31 40,378 N	2 45 53,355 E

Statoil
Survey Report - Geographic

STATOIL

Company:	STATOIL - Norway	**Date:**	16.11.2005	**Time:**	10:22:40	**Page:**	2
Field:	EXPLORATION - UTM Zone 31	**Co-ordinate(NE) Reference:**	Site: 6302/6-U-1, Grid North				
Site:	6302/6-U-1	**Vertical (TVD) Reference:**	SITE 25,0				
Well:	6302/6-U-1	**Section (VS) Reference:**	Well (0,00N,0,00E,330,90Azi)				
Wellpath:	U-1	**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 ---> Deg	Min	Sec		<--- Longitude ---> Deg	Min	Sec	
2026,10	0,0	113,3	2026,08	3,39	-2,65	7044600,90	486302,64	63	31	40,379	N	2	45	53,357	E
2059,90	0,4	84,8	2059,88	3,40	-2,51	7044600,91	486302,79	63	31	40,380	N	2	45	53,368	E
2086,60	0,5	60,8	2086,77	3,47	-2,30	7044600,97	486303,00	63	31	40,382	N	2	45	53,383	E
2122,00	0,5	60,8	2121,97	3,63	-2,02	7044601,13	486303,28	63	31	40,387	N	2	45	53,403	E

Baker Hughes Incorporated
Survey Report

Company:	STATOIL - Norway	**Date:** 04/1111/2005	**Time:** 13:52:33	**Page:**	1
Field:	EXPLORATION - UTM Zone 31	**Co-ordinate(NE) Reference:**	Well: 6302/6-1 (Tulipan), Grid North		
Site:	6302/6-1	**Vertical (TVD) Reference:**	SITE 25.0		
Well:	6302/6-1 (Tulipan)	**Section (VS) Reference:**	Well (0.00N,0.00E,16.13Azi)		
Wellpath:	1	**Survey Calculation Method:**	Minimum Curvature	**Db:**	Oracle

Field: EXPLORATION - UTM Zone 31

Norway

Map System:	Universal Transverse Mercator	**Map Zone:**	UTM Zone 31, North 0 to 6E
Geo Datum:	ED50 (International 1924)	**Coordinate System:**	Well Centre
Sys Datum:	Mean Sea Level	**Geomagnetic Model:**	bggm2005

Site: 6302/6-1

Site Position:		**Northing:**	7044540.65 m	**Latitude:**	63 31 38.430 N
From:	Geographic	**Easting:**	488277.59 m	**Longitude:**	2 45 51.560 E
Position Uncertainty:	0.00 m			**North Reference:**	Grid
Water Depth:	1260.50 m			**Grid Convergence:**	-0.21 deg

Well: 6302/6-1 (Tulipan) **Slot Name:**

Surface Position:	+N/-S	0.00 m	**Northing:**	7044540.65 m	**Latitude:**	63 31 38.430 N
	+E/-W	0.00 m	**Easting:**	488277.59 m	**Longitude:**	2 45 51.560 E
Position Uncertainty:		0.00 m				
Reference Point:	+N/-S	0.00 m	**Northing:**	7044540.65 m	**Latitude:**	63 31 38.430 N
	+E/-W	0.00 m	**Easting:**	488277.59 m	**Longitude:**	2 45 51.560 E
			Measured Depth:	1285.50 m	**Inclination:**	0.00 deg
			Vertical Depth:	1285.50 m	**Azimuth:**	0.00 deg

Wellpath: 1

Drilled From:	Well Ref. Point				
Tie-on Depth:	1285.50 m				
Current Datum:	SITE	**Height**	25.00 m	**Above System Datum:**	Mean Sea Level
Magnetic Data:	04/1111/2005			**Declination:**	0.00 deg
Field Strength:	0 nT			**Mag Dip Angle:**	0.00 deg

Vertical Section:	**Depth From (TVD)** m	**+N/-S** m	**+E/-W** m	**Direction** deg
	1285.50	0.00	0.00	16.13

Survey Program for Definitive Wellpath
Date: 04/1111/2005 **Validated:** No **Version:** 1

Actual From m	**To** m	**Survey**	**Toolcode**	**Tool Name**
1370.00	1952.50	1-BHI.MWD 26" hole (1370.00-19	Magnetic, std, mag-corr	Magnetic Tools (MWD, EMS)
1976.10	2377.40	1-BHI.MWD 17" hole (1976.10-23	Magnetic, std, mag-corr	Magnetic Tools (MWD, EMS)
2404.30	3034.90	1-BHI.MWD 14 3/4" hole (2404.3	Magnetic, std, mag-corr	Magnetic Tools (MWD, EMS)
3058.80	3825.80	1-BHI-MWD 12 1/4" hole (3058.8	Magnetic, std, mag-corr	Magnetic Tools (MWD, EMS)
3856.40	4224.40	1-BHI-MWD 8 1/2" hole (3856.40	Magnetic, std, mag-corr	Magnetic Tools (MWD, EMS)

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**
1285.50	0.00	0.00	1285.50	0.00	0.00	0.00	0.000	0.000	0.000	TIE LINE
1370.00	0.33	301.72	1370.00	0.13	-0.21	0.07	0.117	0.117	0.000	Magnetic, std, mag-corr
1399.20	0.33	349.51	1399.20	0.25	-0.29	0.16	0.275	0.000	49.099	Magnetic, std, mag-corr
1428.30	0.42	283.49	1428.30	0.36	-0.41	0.23	0.428	0.093	-68.062	Magnetic, std, mag-corr
1455.70	0.21	285.01	1455.70	0.40	-0.56	0.23	0.230	-0.230	1.664	Magnetic, std, mag-corr
1484.40	0.38	316.55	1484.40	0.48	-0.68	0.27	0.239	0.178	32.969	Magnetic, std, mag-corr
1512.40	0.90	290.37	1512.40	0.63	-0.95	0.34	0.625	0.557	-28.050	Magnetic, std, mag-corr
1541.30	0.78	280.37	1541.29	0.74	-1.35	0.34	0.196	-0.125	-10.361	Magnetic, std, mag-corr
1570.00	1.05	278.02	1569.99	0.81	-1.80	0.28	0.285	0.262	-2.456	Magnetic, std, mag-corr
1598.50	0.88	250.89	1598.49	0.78	-2.27	0.12	0.507	-0.179	-28.558	Magnetic, std, mag-corr
1628.90	0.46	253.46	1628.88	0.67	-2.61	-0.09	0.415	-0.414	2.536	Magnetic, std, mag-corr
1657.30	0.94	254.84	1657.28	0.57	-2.94	-0.27	0.507	0.507	1.458	Magnetic, std, mag-corr
1686.60	0.94	275.65	1686.58	0.53	-3.41	-0.44	0.351	0.000	21.512	Magnetic, std, mag-corr
1715.70	0.75	263.27	1715.67	0.54	-3.84	-0.55	0.273	-0.196	-12.969	Magnetic, std, mag-corr
1743.90	1.08	279.80	1743.87	0.56	-4.28	-0.65	0.446	0.351	17.585	Magnetic, std, mag-corr
1773.30	1.24	291.53	1773.26	0.72	-4.85	-0.65	0.291	0.163	11.969	Magnetic, std, mag-corr
1802.10	1.12	264.83	1802.06	0.81	-5.42	-0.73	0.560	-0.125	-27.812	Magnetic, std, mag-corr
1830.70	0.59	261.17	1830.66	0.76	-5.85	-0.89	0.559	-0.556	-3.839	Magnetic, std, mag-corr
1859.20	0.39	331.25	1859.15	0.83	-6.04	-0.88	0.617	-0.211	73.768	Magnetic, std, mag-corr
1887.90	0.66	289.71	1887.85	0.97	-6.24	-0.80	0.470	0.282	-43.422	Magnetic, std, mag-corr
1917.00	0.59	293.99	1916.95	1.09	-6.54	-0.77	0.087	-0.072	4.412	Magnetic, std, mag-corr

App C List of contractors

Service	Contractor
Cementing	Halliburton
Core company	Baker Hughes Inteq
Directional Drilling	Baker Hughes Inteq
Liner Hanger Equipment	Weatherford Norge AS
Plug	Weatherford Norge AS
ROV Systems	Oceaneering
Drilling Fluids	M-I Drilling Fluids
Rig Operations	Ocean Rig ASA
Measurement While Drilling	Baker Hughes Inteq
Mud Logging	Geoservices
Subsea WH/X-mas tree	Drill Quip
Casing Crew Service	Weatherford Norge AS
Electric Wireline Logging	Schlumberger
Directional Drilling	Weir/Houston
Sample transfer and on-site analysis	Altinex
Biostratigraphy …	Ichron
Core handling and analysis	Reslab
Mud tracer	Reslab
PVT analysis	Core-lab
Water analysis	West-lab
Positioning and site survey	Fugro

App D MDT pressure measurements

Table 4.7: MDT-GR Run 3A

Test no	Formation	Depth m MD RKB	Depth m TVD SS	Hydrost. Pressure Before bar	Formation Pressure bar	Hydrost. Pressure After bar	Mobility md/cp	Temp DegC	Gradient g/cc	Comments
1	Danian SS	3902.2	3877.0	602.45	557.48	601.986	2.2	79.2	1.466	Good
2	Danian SS	3905.9	3880.7	602.53	-	602.48	-	81.1	-	No seal
3	Danian SS	3905.99	3880.8	602.52	-		-	80.8	-	Tight
4	Danian SS	3906.9	3881.7	602.54	557.43	602.31	26.4	80.7	1.464	Good
5	Danian SS	3914.1	3888.9	604.08	-	603.62	-		-	Tight
6	Danian SS	3920.9	3895.7	605.25	-		-		-	Tight
7	Danian SS	3920.9	3895.7	604.60	540.49	604.381	0.02	82.8	1.414	Unstable
8	Danian SS	3922.2	3897.0	604.89	558.11	604.542	1.9	83.0	1.460	Good
9	Danian SS	3927.8	3902.6	605.96	558.61	605.508	4.5	83.0	1.459	Good
10	Danian SS	3937	3911.8	607.60	559.50	607.087	11.6	83.4	1.458	Good
11	Danian SS	3952.5	3927.3	609.10	561.14	609.662	48.8	84.3	1.456	Good
12	Danian SS	3967.8	3942.6	612.38	562.45	611.93	9.3	85.6	1.454	Good
13	Danian SS	3972.6	3947.4	613.05	562.93	612.49	129.90	86.50	1.454	Good
14	Danian SS	3978.4	3953.2	613.30	-	613.17	0.9	87.6	-	Tight
15	Danian SS	3981.4	3956.2	613.88	-	613.73	1.9	87.8	-	Tight
16	Danian SS	3995.5	3970.3	616.61	-	616.37	2.9	87.9	-	Tight
17	Danian SS	3995.7	3970.5	616.24	574.00	615.89	0.3	88.4	1.474	Supercharged
18	Danian SS	3997	3971.8	616.24	565.41	615.86	25	88.7	1.451	Good
19	Danian SS	4018.1	3992.9	620.36	-	620.06	-	88.4	-	Tight
20	Danian SS	4064.1	4038.9	626.36	-	626.25	-	91.6	-	Tight
21	Danian SS	4070.2	4045.0	627.71	573.00	627.35	2.9	92.7	1.444	Tight
22	SHETLAND GP	4076.5	4051.3	628.85	-	629.56	-	92.7	-	Tight
23	SHETLAND GP	4078.5	4053.3	628.98	-	628.78	-	92.9	-	Tight
24	SHETLAND GP	4097	4071.8	632.36	-	632.08	-	93.3	-	Tight
25	SHETLAND GP	4111.5	4086.3	634.87	-	634.53	-	93.9	-	Tight
26	SHETLAND GP	4122	4096.8	636.45	-	636.18	-	94.7	-	Tight
27	SHETLAND GP	4127	4101.8	637.12	-	636.93	-	95.3	-	Tight
28	SHETLAND GP	4139.5	4114.3	639.27	-	639.02	-	95.7	-	Tight
29	SHETLAND GP	4140.5	4115.3	639.06	-	638.59	-	96.7	-	Tight
30	Danian SS	4070.2	4045.0	573.06	573.06		0.7	95.8	1.444	Good? Repeated test reading same
Sampling										
31	Danian SS	3921.9	3896.7	604.62	-		13.9		-	Looking for sample point
32	Danian SS	3920.9	3895.7		-				-	Abandoned too tight for sampling
33	Danian SS	3920.7	3895.5		-				-	Abandoned too tight for sampling
34	Danian SS	3921.8	3896.6	604.56	-		3.2		-	Abandoned too tight for sampling
35	Danian SS	3921.9	3896.7		-		1.3		-	Abandoned too tight for sampling
36	Danian SS	3922.0	3896.8		-				-	Abandoned too tight for sampling
37	Danian SS	3921.9	3896.7		558.09		3.1		1.460	Abandoned too tight for sampling
38	Danian SS	3952.2	3927.0		561.088		16.1	91.3	1.456	Sampling
39	Danian SS	3952.2	3927.0		561.091		14.9		1.456	Pretest after sampling
40	Danian SS	3902.2	3877.0		557.259		7.7		1.465	Abandoned too tight for sampling
41	Danian SS	3902.1	3876.9		557.295		2.3		1.465	Abandoned too tight for sampling
42	Danian SS	3902.0	3876.8		557.348		1.8		1.465	Abandoned too tight for sampling
43	Danian SS	3903.0	3877.8		557.281		284.3	84.2	1.465	Good, pretest before sampling

Table 4.8 MDT-GR Run 3B

Test no	Formation	Depth m MD RKB	Depth m TVD SS	Hydrost. Pressure Before bar	Formation Pressure bar	Hydrost. Pressure After bar	Mobility md/cp	Temp DegC	Gradient g/cc	Comments
1	Danian SS	3937.1	3937.1	606.36	-				-	Abandoned too tight for sampling
2	Danian SS	3937.1	3937.1	606.98	559.607		9.7		1.449	Abandoned too tight for sampling
3	Danian SS	3937.0	3937.0		559.717		65.7		1.449	Sampling

Table 4.9 MDT-GR Run 3C

Test no	Formation	Depth m MD RKB	Depth m TVD SS	Hydrost. Pressure Before bar	Formation Pressure bar	Hydrost. Pressure After bar	Mobility md/cp	Temp DegC	Gradient g/cc	Comments
1	Danian SS	3920.8	3895.6						-	Sampling with DP.
2	Danian SS	3968.0	3942.8	609.83	562.44		13.7		1.454	Pretest before scanning
3	Danian SS	3967.9	3942.7	609.63	562.41		83.4	99.2	1.454	Fluid scanning
4	Danian SS	3955.0	3929.8	607.71			2.6		0.000	Good, Pretest before scanning
5	Danian SS	3954.9	3929.7	607.68			2.1		0.000	Good, Pretest before scanning
6	Danian SS	3954.8	3929.6	607.68					0.000	Lost seal
7	Danian SS	3954.7	3929.5	607.66					0.000	Good, Pretest before scanning
8	Danian SS	3954.9	3929.7	607.67	561.22		19.6		1.456	Scanning
9	Danian SS	3934.1	3908.9	604.33				98.9	-	Pretest before scanning, tight
10	Danian SS	3934.0	3908.8	604.37	559.21		13.9	98.4	1.458	Good
11	Danian SS	3934.1	3908.9	604.32				98.0	-	Pretest before scanning, tight.
12	Danian SS	3933.9	3908.7	604.30					-	Lost seal
13	Danian SS	3933.9	3908.7	604.30					-	Lost seal
14	Danian SS	3934.0	3908.8	604.30					-	Lost seal
15	Danian SS	3933.8	3908.6	604.34					-	Tight
16	Danian SS	3934.0	3908.8	604.21					-	Tight
17	Danian SS	3933.9	3908.7	604.14					-	Tight
18	Danian SS	3934.0	3908.8	604.23					-	Tight
19	Danian SS	3934.0	3908.8	604.23					-	Tight

App E NPD standard sheet for reporting shallow gas – 6302/6-U-1 & 6302/6-1

1. Avstand fra boredekk til havnivå: 25m

2. Vanndyp: 1259 m MSL & 1260.5 m MSL

3a. Settedyp for lederør: 1363 m MD & 1363 m MSL

3b. Evt. formasjonstyrketest (g/cc): N/A

4a. Settedyp for foringsrør hvorpå BOP settes: 2116.5 m MD & 1960 m MD

6. *Dybdeintervall (mRKB og mTVD) og alder for sandlag grunnere enn 1000 m under havbunnen. Oppgi hvilke lag som evt. inneholder gass.*
6302/6-U-1: Kvartære sandlag på 1977-1978 m, 1987-1988 m, 2070-2071 m, 2097-2098 m, 2114-2116 m; vannholdige.
6302/6-1: Kvartære sandlag på 2085-2086 m, 2101-2102 m, 2225-2226 m; vannholdige.

7. Grunn gass er ikke påvist i brønnen.

8. Sammensetning og opprinnelse til gassen: N/A

9. Beskriv alle målinger i gassførende lag: N/A

10. *Angi dyp (mRKB og TVG) til inkonformiteter i borehullsposisjonen:*

11. Angi utbredelsen av sandlagene (kommunikasjon, kontinuitet, trunkering, etc.):
Kun tynne sandlag observert. Korrelasjon mellom de to topphullene er mulig i grov skala. Korrelasjon av enkeltsander er mer spekulativ.

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

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

14. *Hvordan samsvarer tolkingen av borestedsundersøkelsen med borehullsdata mht. :*
- grunn gass
Stemmer bra. Ingen grunn gass prognosert i 36” og 26” hullseksjon, og ingen grunn gass observert.
- Påvist vannstrømming fra sandlag på 2114m. Dette var ikke prognosert, men likevel ikke utelukket. Det var tatt høyde for en eventuell vannstøm i brønnforberedelsene.

App F Listing of other reports

REPORTS	COMPANY
Well Programme PL 159, Well 6507/3-4	STATOIL
Tulipan 3D Regional Geohazard Assessment for Statoil Vol. I	FUGRO GEOTEAM
Tulipan Location specific Geohazard Assessment for Statoil Vol. II	FUGRO GEOTEAM
Navigation and Positioning Report of the "Eirik Raude", Well 6302/6-1	FUGRO TGS NORGE
Permanent P&A Programme - PL251, Well 6302/6-1 – Tulipan	STATOIL
Final drilling report - Well 6302/6-1 Tulipan PL251	STATOIL
Final Well Report, Mudlogging Tulipan 6302/6-1	GEOSERVICE
Final Well Report, Flair Tulipan 6302/6-1	GEOSERVICE
End of Well Report, Well 6302/6-1 – MWD & Survey	BAKER HUGHES INTEQ
Final Core Report - Tulipan 6302/6-1	BAKER HUGHES INTEQ
Core photographs well 6302/6-1, White / UV-light, Core 1-3	RESLAB
Corimag Core photo, High/Medium/Low resolution - well 6302/6-1	RESLAB
A Biostratigraphical Evaluation of the Pleistocene to Late Cretaceous Interval in well 6302/6-1, Tulipan Prospect	Ichron
VSP Borehole Seismic Report	Schlumberger
Reservoir fluid study for Statoil as, Tulipan 6302/6-1 MDT	CoreLab
Sample Qualification Report, 6302/6-1 Tulipan	Altinex
Well 6302/6-1, Tulipan field, Danian formation, Characterisation of water samples	Statoil
Conventional core analysis, Tulipan, Well 6302/6-1	RESLAB
Charaterisation of water samples	WESTLAB

7 Enclosures

Wellsite sample descriptions

Conventional Core descriptions

Sidewall core descriptions

Composite log, well 6302/6-U-1

Composite log, well 6302/6-1

Formation evaluation log, well 6302/6-U-1

Formation evaulation log, well 6302/6-1

STATOIL

WELLSITE SAMPLE DESCRIPTION (ROV samples)			Page 1 of 2
Country: Norway	Area: Møre Basin	Field: Tulipan	
Well no: 6302/6-1	Company: Statoil ASA		
RKB: 25 meters	Geologist: Greve/Rasmussen		
Hole size: 26”	Cut solvent:	Date: 06.06.2005	

Depth (m RKB)	Lithology (%)	Lithological Description: Rock name, mod.lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed.structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
1380	70	Sd/Sst	pred lse Gr, clr – trnsl qtz, occ mlky wh, occ lt pnk, occ lt brn, v f – v crs grn, v prly srt, ang – sbrndd, Tr rndd; Tr Sst Frags, lt olv gry, v f, calc	Sample # 13
	30	Cl/Clst	olv gry, sft, amor, stky, calc	
	Tr		Pyr, lit Frags	
1435	70	Sd/Sst	lse Gr, v f – v crs, sbang – sbrndd, Tr rndd, else a.a.	14
	30	Cl/Clst	pred a.a.	
	Tr	Ls	off wh, mod hd, microxln	
	Tr		Pyr, lit Frags, Shl Frags	
1460	60	Cl/Clst	a.a.	15
	40	Sd/Sst	v f – v crs – gran, else a.a.	
	Tr	Ls	a.a.	
	Tr		a.a.	
1525			Lost	16
1578	60	Cl/Clst	a.a.	17
	40	Sd/Sst	a.a.	
	Tr	Ls	a.a.	
	Tr		lit Frags, Shl Frags	
1632	60	Cl/Clst	a.a.	19
	40	Sd/Sst	a.a.	
	Tr	Ls	a.a.	
	Tr		Pyr, lit Frags, Shl Frags	
1661			pred a.a.	20
1718	90-95	Sd/Sst	pred a.a., Tr galu	
	5-10	Ls	a.a.	
	Tr	Cl/Clst	olv gry, sft, amor, calc	21
	Tr		a.a.	
1776			pred a.a.	22
1801			a.a.	23
1829			a.a.	24
1864			a.a.	04
1915			Tr Mic, else a.a.	05
2032			a.a.	06
2052			a.a.	07

All samples were taken at the sea bottom close to the well head with the ROV. The current at the sea bottom winnowed away some of the finer fractions, and furthermore the samples had to be washed slightly in order to describe it. This must be taken into account when reading the descriptions. The percentages are roughly estimated as seen in the samples. There is however a

WELLSITE SAMPLE DESCRIPTION (ROV samples)				Page 2 of 2
Country: Norway		Area: Møre Basin		Field: Tulipan
Well no: 6302/6-1		Company: Statoil ASA		
RKB: 25 meters		Geologist: Greve/Rasmussen		
Hole size: 26”		Cut solvent:		Date: 06.06.2005

Depth (m RKB)	Lithology (%)	Lithological Description: Rock name, mod.lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed.structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.

pronounced lithological transmission in the samples at 1718 m. The clay became non sticky and was more easily washed away. The samples proved to be more sandy, but this could also be due to winnowing and washing away the finer fractions.

STATOIL

WELLSITE SAMPLE DESCRIPTION			Page 1 of 27
Country: Norway	Area: Møre Basin	Field: Tulipan	
Well no: 6302/6-1	Company: Statoil ASA, Norske Shell A.S		
RKB: 25 meters	Geologist: Giskeødegaard, Rasmussen		
Hole size: 17”	Cut solvent:	Date: 10-12.07.2005	

Depth (m RKB)	Lithology (%)	Lithological Description: Rock name, mod.lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed.structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
1970	90	Cmt	
	10	Cl	olv gry – lt gry, sft, blky, calc Cmt, v f sdy & slty, Tr lse m Qtz Gr, Tr m Glauc Gr
1975	90	Cmt	
	10	Cl	a.a.
1980	20	Cmt	
	80	Cl	a.a.
1985	100	Cl	olv gry – lt gry, dusky yel brn, sft, blky, calc, v f sdy, Tr micromic, slty, Tr lse m Qtz Gr, Tr m Glauc Gr
1990	100	Cl	a.a.
	Tr	Sd	clr – trnsl Qtz, v f – m, pred f, lse, rndd, mod srt, no Cmt, Tr m Glauc Gr
1995	60	Cl	a.a. Tr of Shl Frag
	40	Sd	pred v f – f, Tr m – v crs
2000	60	Cl	a.a.
	20	Sd	a.a.
	20	Cmt	
2005	60	Cl	a.a.
	40	Sd	a.a. v f – f, Tr m – crs
2010	70	Cl	olv gry – lt gry, sft, blky, calc Cmt, v f sdy & slty, Tr lse m Qtz Gr, Tr m Glauc Gr
	30	Sd	clr –trnsl Qtz, v f – m, pred f, lse, rndd, mod srt, no Cmt, Tr m Glauc Gr, Tr Shl Frag
2015	80	Cl	a.a.
	20	Sd	a.a.
2020	60	Cl	a.a.
	40	Sd	a.a., v f – m gr, Tr crs Gr
2025	80	Cl	a.a.
	20	Sd	a.a.
2030	80	Cl	a.a.
	20	Sd	a.a.
	Tr	Dol	pa yel brn – brn gry, v hd, blky, microxln
2035	90	Cl	a.a.
	10	Sd	a.a.
2040	90	Cl	a.a.
	10	Sd	a.a.

WELLSITE SAMPLE DESCRIPTION			Page 2 of 27
Country: Norway	Area: Møre Basin	Field: Tulipan	
Well no: 6302/6-1	Company: Statoil ASA, Norske Shell A.S		
RKB: 25 meters	Geologist: Giskeødegaard, Rasmussen		
Hole size: 17”	Cut solvent:	Date:	10-12.07.2005

Depth (m RKB)	Lithology (%)	Lithological Description: Rock name, mod.lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed.structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
2045	90	Cl	olv gry – lt gry, dusky yel brn, sft – firm, loc sticky, blky, calc, slty, v f sdy, Tr Glauc, Tr micromic , Tr Shl Frag	
	10	Sd	clr – trnsl Qtz, mky wh & rose Qtz, Tr rock Frag, v f – m, pred f, Tr crs, lse, rndd, mod srt, no Cmt, Tr m Glauc Gr, Tr Shl Frag	
2050	90	Cl	a.a.	
	10	Sd	a.a.	
2055	a.a.			
2060	80	Cl	a.a.	
	20	Sd	a.a.	
2070	100	Cl	a.a.	
	Tr	Sd	a.a.	
2075	a.a.			
2080	a.a.			
2085	a.a.			
2090	100	Cl		
	Tr	Sd		
	Tr	Ls	wh – lt gry, firm, blky, microxln	
2095	100	Cl	a.a.	
	Tr	Sd	a.a.	
2100	100	Cl	a.a.	
2105	a.a.			
2110	a.a.			
2115	a.a.			
2120	a.a.			
2125	a.a.			
2130	lost			
2135	a.a.			
2140	100	Cl	sft – firm, else as above	
2145	a.a.			

Depth (m RKB)	Lithology (%)	Lithological Description: Rock name, mod.lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed.structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
2150	100	Cl	olv gry – lt gry, sft – firm, locly sticky, blky, calc, slty, v f sdy, Tr Glauc, Tr Micromic	
2155	100	Cl	a.a.	
2160	100	Cl	a.a.	
2170	100	Cl	a.a.	
2180	90	Cl	olv gry – lt gry, sft – firm, locly sticky, blky, calc, slty, v f sdy, Tr Glauc, Tr Micromic	
	10	Sd	clr – trnsl Qtz, mky wh Qtz, Tr Rk Frag, v f – m, pred f, lse, rndd, mod srt, no Cmt, Tr Glauc Gr, Tr Shl Frag	
2190	90	Cl	a.a.	
	10	Sd	a.a.	
2200	80	Cl	a.a.	
	20	Sd	a.a. also rose Qtz, Tr pbl Rk Frag	
2210	80	Cl	a.a.	
	20	Sd	a.a.	
2220	90	Cl	a.a.	
	10	Sd	a.a.	
2230	100	Cl	a.a.	
2245	100	Cl	a.a. gd Tr Glauc	
	Tr	Sd	a.a.	
2250	100	Cl	a.a.	
2260	90	Cl	a.a.	
	10	Sd	a.a.	
2270	80	Cl	a.a.	
	20	Sd	a.a.	
2280	70	Cl	a.a.	
	30	Sd	Tr Shl Frag & fossil Frag, else a.a.	
2290	90	Cl	a.a.	
	10	Sd	a.a.	
2300	a.a.			
2310	100	Cl	a.a.	
	Tr	Sd	a.a.	

WELLSITE SAMPLE DESCRIPTION			Page 4 of 27
Country: Norway	Area: Møre Basin	Field: Tulipan	
Well no: 6302/6-1	Company: Statoil ASA, Norske Shell A.S		
RKB: 25 meters	Geologist: Giskeødegaard, Rasmussen		
Hole size: 17”	Cut solvent:	Date:	10-12.07.2005

Depth (m RKB)	Lithology (%)	Lithological Description: Rock name, mod.lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed.structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
2320	100	Cl	olv gry – lt gry, sft – firm, locly sticky, blky, calc, slty, v f sdy, Tr Glauc, Tr Micromic	
	Tr	Sd	clr – trnsl Qtz, mky wh Qtz, Tr Rk Frag, v f – m, pred f, lse, rndd, mod srt, no Cmt, Tr Glauc Gr, Tr Shl Frag & fossil Frag	
2330	a.a.			
2340	100	Cl	slty – v f sdy, else a.a.	
2350	a.a.			
2360	a.a.			
2370	a.a.			
2380	a.a.			
2390	a.a.			
			TD of 17”x20” section at 2390m MD RKB	

Depth (m RKB)	Lithology (%)	Lithological Description: Rock name, mod.lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed.structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
2394	70	Cmt	Abd, G – seal &
	20 Clst	m –m dk gry, firm – sft,calc	CaCO3 mud additive
	10 Sd	clr, trnsl, v f – f ,mod srt, ang – sbrndd, lse	
2400	90 Clst	m gry – m dk gry, pred sft, sticky, slty, modly calc	
	10 Sd	a.a.	
		Cmt Contam	
2410	100 Clst	a.a.	
	Tr Sd	a.a.	
2420	100 Clst	m dk gry, firm – sft, slty, sticky, calc, Micromic, Tr Glauc	
	Tr Sst	clr Qtz, v f – f, modly sort, modly – wl rndd, lse	
2430	90 Clst	a.a.	
	10 Sst	clr Qtz, v f – f, mod –wl srt	still small amounts of CaCO3
2440	90 Clst	a.a.	
	10 Sst	a.a.	a.a.
2450	90 Clst	a.a.	
	10 Sst	a.a. mostly v f	2463m Kai Fm.
2460	90 Clst	a.a.	Ooze, Foram as Tr
	10 Sst	a.a.	
2470	90 Clst	a.a. slty	
	10 Sst	a.a.	
2480	90 Clst	a.a. slty	
	10 Sst	a.a.	
2490	90 Clst	a.a.	
	10 Sst	a.a. v f – slty	
2500	90 Clst	a.a. occly brnsh	
	5 Sst	a.a.	
	5	Glauc, mic, Forams, Chlor	
2510	90 Clst	m dk gry, dk gnsh gry, brnsh gry, sft – firm, amor – occly sbblky, sticky, slty & sdy i.p., Tr Glauc, Pyr, Mic & Forams, slily – modly calc	
	10 Sd	clr v f – f, modly wl srt, sbang, sbrnd, Glauc, Mic, Forams & Pyr	
	hi Tr	Glauc, Mic, Forams & Pyr	
2520	90 Clst	a.a., & occly pa yel gry – m yel gry, brnsh – olv gry	
	10 Sd	a.a.	
	hi Tr	Glauc, Tr Pyr & Foram (Ooze) , Tr Mic	

WELLSITE SAMPLE DESCRIPTION			Page 6 of 27
Country: Norway	Area: Møre Basin	Field: Tulipan	
Well no: 6302/6-1	Company: Statoil ASA, Norske Shell A.S		
RKB: 25 meters	Geologist: Undersrud, Gilpin, de Lesquen		
Hole size: 14 3/4"	Cut solvent:	Date: 25.07.2005	

Depth (m RKB)	Lithology (%)	Lithological Description: Rock name, mod.lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed.structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
2530	90	Clst	brnsh gry – olv gry, m – m dk gry, dk gnsh gry, sft – firm, amor – sbblky, slty, hi Tr Glauc, Tr Pyr, Micromic & Forams	
	10	Sd	a.a., Tr yel & or	
	Tr	Ooze	Forams	
2540	90	Clst	olv gry – brnsh gry, m gry, dk gnsh gry i.p., sft – firm, sbblky, amor, sticky, abd Glauc, Tr mica, non – mod calc	
	10	Sd	a.a.	
	Tr	Ooze	Forams	
2550	90	Clst	a.a. + occ lt olv gry, sft – firm, sbblky – amor, sticky, slty i.p., locly slily sdy, Tr Glauc, & Micromic, r Tr Micropyr, non – mod calc	2 – 3ppm C3
	10	Sd	a.a.	
2560	90	Clst	olv gry – brnsh gry, occ dk gnsh gry a.a.	rnd Foram or Radioalaria?
	10	Sd	a.a.	
	Tr		Glauc & Pyr, mica (some Chlor)	
	Tr		Forams/radiolaria?	
2570	90	Clst	a.a. + occly pa gry, pa yel gry – wh, sft & calc	
	10	Sd	a.a.	
	rTr	Ls	dk yel gry, hd, ang, micritic	
2580	90	Clst	a.a.	occ C2 – 8ppm
	10	Sd	a.a.	
				2585m Brygge Fm.
2590	90	Clst	brnsh gry – olv gry, occly dk gnsh gry, a.a., Tr Glauc, sli – modly calc	steady C2= 5 – 13 ppm, C3=2 – 3ppm
	10	Sd	a.a.	
2600	90	Clst	a.a. + occly pa yelsh gry – pa gry & v calc	
	10	Sd	a.a.	
2610	85	Clst	brnsh gry – olv gry, v occly gn, occly lt brnsh gry, sft – firm, amor – sbblky, slty, Glauc, Tr Micropyr, non – modly calc, occly v calc	
	10	Sltst	lt brnsh gry, firm, ang – blky, poor – no sil Cmt (Ooze?)	
	5	Sd	clr – trnsl, v f – f, wl srt, sbang – sbrnd	
2620	80	Clst	a.a. + lt brnsh gry, occly modly hd – hd & non calc (poss sil Ooze? 15%)	
	15	Sltst	a.a.	
	5	Sd	a.a.	
2630	85	Clst	brnsh gry, occly olv gry, sft – firm, v occly modly hd, amor – sbblky, Tr of hder more sil? Mat, non – modly calc	abd Glauc
	10	Sltst	a.a.	
	5	Sd	a.a.	
	Tr	Ls	yel brn, ang, hd, microxln	

WELLSITE SAMPLE DESCRIPTION			Page 7 of 27
Country: Norway	Area: Møre Basin	Field: Tulipan	
Well no: 6302/6-1	Company: Statoil ASA, Norske Shell A.S		
RKB: 25 meters	Geologist: Undersrud, Gilpin, de Lesquen		
Hole size: 14 3/4”	Cut solvent:	Date: 25.07.2005	

Depth (m RKB)	Lithology (%)	Lithological Description: Rock name, mod.lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed.structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
2640	85	Clst	brnsh gry – olv gry, occly dk gnsh gry, sft occly firm, amor – sbblky, slty, Glauc, Micromic, r Pyr Micropyr, non – modly calc	
	10	Sltst	lt brnsh gry, firm, ang – blky, poor – no sil Cmt (Ooze?)	
	5	Sd	clr – trnsl, v f – f, wl srt, sbang – sbrnd	
2650	90	Clst	brnsh gry – olv gry a.a.	
	5	Sltst	a.a.	
	5	Sd	a.a.	
2660	100	Clst	a.a. glauc	
	Tr	Sltst		
	Tr	Sd		
	Tr		Foram	
2670	100	Clst	a.a.	
	Tr	Sltst		
	Tr	Sd		
	Tr		Foram	
2680	85	Clst	a.a.	
	15	Sltst/Ooze	lt brnsh gry, firm, sbblky, non calc	
	Tr	Sd	a.a.	
	Tr		Microfos, pa gn copper, v rnd, spikey radiolaria	
2700	80	Clst	lt gry – olv gry, blky	
	15	Sltst	lt brn – pa yel brn	
	5	Sd	clr, v f – f, modly srt, sbrndd – rndd, lse, Glauc, Pyr	
2710	100	Clst	lt gry – olv gry, blky, calc, Glauc	
	Tr	Sd	clr, v f – f, modly srt, sbang – sbrndd, lse	
2720	95	Clst	olv gry, blky, Glauc	
	5	Sd	clr, v f – f, sbrndd – rndd, modly srt, lse	
2730	100	Clst	a.a.	
2740	100	Clst	a.a.	
2745	100	Clst	lt brnsh gry – olv gry, blky, calc, Glauc	
2755	100	Clst	olv gry, occly dk gnsh gry, blky, Glauc	
2765	100	Clst	olv gry, occly dk gnsh gry, blky, calc, Glauc	
2770	100	Clst	a.a.	
2780	100	Clst	a.a.	OPAL A/CT 2772.2m
2790	100	Clst	a.a.	

WELLSITE SAMPLE DESCRIPTION			Page 8 of 27
Country: Norway	Area: Møre Basin	Field: Tulipan	
Well no: 6302/6-1	Company: Statoil ASA, Norske Shell A.S		
RKB: 25 meters	Geologist: Undersrud, Gilpin, de Lesquen		
Hole size: 14 3/4”	Cut solvent:	Date: 25.07.2005	

Depth (m RKB)	Lithology (%)	Lithological Description: Rock name, mod.lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed.structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
2800	100	Clst	olv gry, occly dk gnsh gry, blky, calc, Glauc	2793m CG=1.06% w/
	Tr	Sd	clr, v f – f, sbrndd, wl srt, lse	backgrnd of 0.4%
2810	100	Clst	a.a.	
	Tr	Sd	clr, v f – f, sbrndd – rndd, modly wl srt	
	Tr	Sltst	lt gnsh gry, firm, blky	
2820	100	Clst	a.a.	2822m POG=0.54% w/ backgrnd of 0.24%
	Tr	Sltst	lt brnsh gry	2822m CG=0.96% w/ backgrnd of 0.43%
2830	90	Clst	a.a.	
	10	Sltst	a.a.	Increased on/off
	Tr	Sd	clr, v f, sbang, wl srt, lse	bottom torque since
	Tr		Foram	OPAL/ACT
2840	90	Clst	a.a.	
	5 – 10	Sltst	a.a.	
	Tr	Sd	a.a.	
2850	90	Clst	olv gry, occly dk gnsh gry, blky, calc, mic, Glauc	
	5 – 10	Sltst	a.a.	
	Tr	Sd	clr, v f – f, sbang – ang, wl srt, lse	
2860	95	Clst	a.a.	
	5	Sltst	a.a.	
	Tr	Sd	clr – trnsl, v f – crs, sbang – sbrndd, poorly srt	
2870	100	Clst	a.a.	
	Tr	Sd	clr, v f – f, ang – sbrndd, wl srt, lse	
2880	100	Clst	olv gry – brnsh gry, occly dk gnsh gry, sft – firm, occ modly hd, amor – sbblky, occly blky, non – slily calc	
	Tr	Sd	a.a.	
2890	100	Clst	a.a.	
	Tr	Sd	a.a.	
2900	100	Clst	a.a.	
	Tr	Sd	a.a.	
2910	100	Clst	a.a. pred olv gry – brnsh gry	
	Tr	Sd	a.a.	
2920	100	Clst	a.a.	
	Tr	Sltst	lt brnsh gry, occly pa gry, firm, non calc	
2930	95	Clst	a.a.	A lot of rubbly Cvgs, 3 – 5cm x 2 – 3cm, blky,

Country: Norway	Area: Møre Basin	Field: Tulipan
Well no: 6302/6-1	Company: Statoil ASA, Norske Shell A.S	
RKB: 25 meters	Geologist: Undersrud, Gilpin, de Lesquen	
Hole size: 14 3/4"	Cut solvent:	Date: 25.07.2005

Depth (m RKB)	Lithology (%)	Lithological Description: Rock name, mod.lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed.structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
			slily sbtab, ang – mechanical?
	5	Sltst	lt brnsh gry, occly pa gry, firm, non calc	
	Tr	Sd	clr, trnsl, v f – occly f, wl srt, sbang – sbrnd	
2940	95	Clst	a.a. v r Glauc, non calc	2937m raise
	5	Sltst	a.a.	mudweight – 1.33 sg
2950	90	Clst	a.a., r m dk gry, non calc	
	5	Sltst	a.a.	
	5	Ls	yel brn, crm, ang, blky, hd, micritic	
	Tr	Sd	a.a.	
2960	100	Clst	a.a.	
	Tr	stlst	a.a.	
	Tr	Sd	a.a.	
2970	100	Clst	a.a.	
	Tr	Sd	a.a.	
2980	100	Clst	pred a.a., Tr pa gnsh gry, slty, slily Glauc	
	Tr	Sd	a.a.	
2990	75	Clst 1	a.a.	
	25	Clst 2	pa gnsh gry – dk gnsh gry, lt gry, v sft, amor, locly slily slty, Tr Glauc, non calc, Tr wh v sft v calc	
	hi Tr	Sd	a.a.	
3000	50	Clst 1	a.a.	
	50	Clst 2	a.a.	
3010	60	Clst 2	pa gnsh gry – dk gnsh gry, lt gry, v sft occly firm, amor, locly slily slty, high Tr Glauc, Tr Pyr, non calc, Tr wh v sft v calc	
	40	Clst 1	olv gry – brnsh gry, occly dk gnsh gry, firm, occly modly hd, amor – sbblky, occly blky, non – slily calc	
3020	75	Clst 2	a.a.	
	25	Clst 1	a.a.	
3030	100	Clst 2	a.a.	
	Tr	Clst 1	a.a.	
3040	100	Clst 2	gnsh gry – gryish gn, amor occly firm, locly dk gnsh gry modly hd	
	Tr	Clst 1	a.a.	
			TD of 14 3/4" section at 3040m MD RKB	

Country: Norway	Area: Møre Basin	Field: Tulipan
Well no: 6302/6-1	Company: Statoil ASA, Norske Shell A.S	
RKB: 25 meters	Geologist: Giskeødegaard, Greve	
Hole size: 12 1/4"	Cut solvent:	Date: 15.08.2005

Depth (m RKB)	Lithology (%)	Lithological Description: Rock name, mod.lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed.structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
3052	20	Clst	olv gry, dk grnsh gry, grn glauc Clst, sft – frm, also mod – hd, sbblky – blky, non calc, glauc	
	890	Cmt		
	Tr	Sst	lse Qtz gr, m – crs, mlky wh – clr Qtz Gr, sbrnd, wl srt, sph	
3060	100	Clst	m gry – olv gry, brnsh gry, sft – frm, sbblky, micromic, glauc, non calc	
	Tr	Cmt		
3070	100	Clst	a.a., also m lt gry	
	Tr	Ls	lt gry – v lt gry, frm, occ mod hd, sbblky – sbrnd,	
3080	100	Clst	a.a., frm, non – sli calc, occ slty	
	Tr	Ls	a.a., lt brn	
3090	100	Clst	a.a., sft – frm, also m lt gry – m gry, occ dk gry – grysh blk, blky – sbblky	Mud additives
3100	100	Clst	grnsh gry – dk grnsh gry, frm, sli calc, blky, glauc	Mud additives
3115	100	Clst	grnsh gry – dk grnsh gry, frm – mod hd, sl calc, blky, glauc, occ sl slty	Mud additives
3120	100	Clst	grnsh gry – dk grnsh gry, frm, sli calc, blky, glauc	Mud additives
3140	100	Clst	a.a., occ lt gry	Mud additives
	Tr	Ls	lt brn, yelsh brn, mod hd – hd	
3150	100	Clst	a.a., lt gry (kaol?) m lt gry, occ lt blsh gry, sft – frm, sbblky	Mud additives
3160	100	Clst	grnsh gry – dk grnsh gry, frm, blky, glauc	Mud additives
	Tr	Ls	v pa brn, mod hd	
3170	100	Clst	grnsh gry – dk grnsh gry, frm, non calc, blky, glauc	Mud additives
	Tr	Sst	Qtz Gr, v c, mlky wh, sbrnd, hisph	
3180	90	Clst	grnsh gry – dk grnsh gry, frm, non calc, blky, glauc	
	10	Sltst	brnsh gry – brnsh blk, sft, fri, amor	
3190	100	Clst	grnsh gry – dk grnsh gry, grysh brn, frm – occ mod hd, non calc, blky, glauc	
	Tr	Sltst	a.a.	
3200	100	Clst	a.a.	
3210	100	Clst (1)	m lt gry – m gry, grnsh gry, sbblky, slty, sli – calc, sli micromic	
		Clst (2)	grysh brn – brnsh blk, blky, frm – mod hd, micromic, sli micropyr	
	Tr	Ls	v lt gry – lt gry, sbblky, mod hd, crmb, microxln, arg	
3220	100	Clst(1)	a.a., m blsh gry	
		Clst(2)	a.a.	

Country: Norway	Area: Møre Basin	Field: Tulipan
Well no: 6302/6-1	Company: Statoil ASA, Norske Shell A.S	
RKB: 25 meters	Geologist: Giskeødegaard, Greve	
Hole size: 12 1/4"	Cut solvent:	Date: 15.08.2005

Depth (m RKB)	Lithology (%)	Lithological Description: Rock name, mod.lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed.structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
	Tr	Ls	v lt gry – lt gry, sbblky, mod hd, crmb, microxln, arg	
3230	100	Clst (1)	m lt gry – m gry, grnsh gry, sbblky, slty, sl micromic non – slily calc	
	Tr	Ls	wh – off wh, v lt gry, else a.a.	
3240	100	Clst (1)	m lt gry – m gry, grnsh gry – pa grn, occ m dk gry – dk gry, sbblky, slty, sli – calc, sli micromic	
		Clst (2)	grysh brn – brnsh blk, blky, frm – mod hd, micromic, sli micropyr	
3250	100	Clst	varicol, m lt gry – m gry, occ m dk gry, occ m blsh gry, also (2)	
			a.a., sbblky – blky, occ slty, sli calc – calc, gen frm, occ sft	
	Tr	Ls	a.a.	
	Tr	Sst	lse Qtz gr, f, occ m, pr srt, clr – trnsl, occ mlky wh, ang – sbang	
3260	100	Clst	a.a. varicol	
	Tr	Ls	a.a.	
	Tr	Sst	a.a.	
3270	100	Clst	a.a. varicol, gnsh gry – dk gnsh gry, dk gnsh gry, m lt gry – m gry, dk rdsh brn occ m blsh gry, sft – frm, sbblky, occ slty, i.p. sdy, sli calc	
	Tr	Ls	a.a.	
3290	100	Clst	a.a., varicol	
	Tr	Ls	a.a., wh – v lt gry, blky	
	Tr	Sst	lse Qtz gr, vf – f, occ m, mlky wh – opq, sbrnd – sbang	
3300	100	Clst	a.a., sli calc – calc	
	Tr	Ls	a.a.	
3310	100	Clst	a.a., dom grnsh gry – dk gry – olv gry, crmb, sbblky, pyr	
	Tr	Sst	f – m, occ crs, lse Qtz gr, clr – opq, sbang, pyr nod	
3320	100	Clst	gnsh gry – dk gnsh gry, bnsh gry, frm, non calc, sbblky, glauc	
	Tr	Ls	a.a.	
3330	100	Clst	dk gry, gnsh gry, bnsh gry, sft – mod hd, sbblky, non calc, glauc	
3340	100	Clst	a.a.	
	Tr	Ls	yel brn, mod hd	
3350	100	Clst	a.a. also Tr Pyr	
	Tr	Ls	a.a.	
3360	90	Clst	a.a. also Tr slty	
	10	Ls	v lt gry – lt gry, sbblky, mod hd, crmb, microxln, arg, loc yel brn, hd, grad Dol	
3370	90	Clst	a.a. also tf Clst, spk, loc calc, loc ashy Tex	
	10	Ls	a.a.	

Country: Norway	Area: Møre Basin	Field: Tulipan
Well no: 6302/6-1	Company: Statoil ASA, Norske Shell A.S	
RKB: 25 meters	Geologist: Giskeødegaard, Greve	
Hole size: 12 1/4"	Cut solvent:	Date: 15.08.2005

Depth (m RKB)	Lithology (%)	Lithological Description: Rock name, mod.lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed.structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
3390	100	tf Clst	lt gry – olv gry, brn gry, grn gry, sft – frm, blk spk, sbblky, non calc, loc calc i.p., Tr slty, r pyr	
	Tr	Ls	v lt gry – lt gry, sbblky, mod hd, crmb, microxln, arg, loc yel brn, hd, grad Dol	
3400	80	tf Clst	a.a.	
	20	Ig	ig intr(?), pl grn, spek, loc calc, Qtz, Biot, Pyr, loc v hd, gen vit	
3410	80	tf Clst	a.a.	
		Ls	a.a.	
3420	90	Clst	a.a.	
	10	Ls	a.a.	
	Tr	Dol	dusky yel brn – pl yel brn, olv gry, hd, blky, suc, micro – crptoxln	
3430	100	Clst	olv gry – lt gry, brn gry – grn gry, gen sft, loc stky, gen calc – v calc, loc slty, Tr Pyr, loc vf sdy grad vf Sst	
	Tr	Ls	a.a.	
3440	100	tf Clst	lt gry – olv gry, bl gry, grn gry – brn gry, sft – frm, blky – sbblky, non calc – calc, loc blk/wh spc, Tr Pyr, Tr slty	
	Tr	Ls	a.a.	
	Tr	Dol	dusky yel brn – pl yel brn, olv gry, hd, blky, suc, micro – crptoxln	
3445	100	tf Clst	a.a.	
	10	Dol	pl yel brn – brn, dk gry, v hd, suc i.p., micro – crptoxln, loc arg grad Ls	
	Tr	Ls	a.a.	
3450	100	Clst	lt gry – olv gry, brn gry – grn gry, also Tr tf Clst, sft – frm, blky – sbblky, gen calc, Tr Pyr, Tr Glauc, Tr slty, loc vf sdy	
	Tr	Ls	v lt gry – lt gry, sbblky, mod hd, crmb, microxln, arg, loc yel brn, hd, grad Dol	
3460	100	tf Clst	lt gry – olv gry, bl gry, grn gry – brn gry, sft – frm, blky – sbblky, non calc – calc, loc blk/wh spc, Tr Pyr, Tr slty	
	Tr	Ls	a.a.	
	Tr	Sst	clr Qtz, vf, sbang – sbrndd, v hd, mod srtd, w cmtd, silic cemt, Tr Mic, Tr Glauc, n.v.p.	No Shows
3470	100	tf Clst	a.a.	
	Tr	Dol	pa yel brn – brn, dk gry, v hd, suc i.p., micro – crptoxln, loc arg grad Ls	
3480			Lost	
3490			pred a.a.	
3500	100	tf Clst	a.a.	
	Tr	Ls	gry wh, sft – frm, arg	

Depth (m RKB)	Lithology (%)	Lithological Description: Rock name, mod.lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed.structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
	Tr	Sst	lse clr – trnsl Qtz, v f, rr m	
	Tr	Pyr	nods	
3510	100	Clst	pred tuff a.a., Tr brn gry, gn gry	
	Tr	Sst	a.a.	
	Tr	Ls	gry wh, sft – frm, arg	
3520	100	Clst	pred a.a., rr rd brn	
	Tr	Sst	a.a.	
	Tr	Ls	a.a.	
3530	95	Clst	decr tuff, incr olv gry – brn gry, gn gry	
	5	Sst	v f – f, rr m – crs	
	Tr	Pyr	nods	
3540	95	Clst	m lt gry – m gry, olv gry, dk gn gry, sft, i.p. tuff, occ calc	
	5	Sst	pred lse, clr – trnsl Qtz, v f – f, Tr m – crs; Tr Sst Frags, yel brn, v f, mod hd, arg Mtrx, sil/calc cmtd	
	Tr	Pyr	nods	
3550	100	Clst	incr olv gry, dk gn gry, else a.a.	
	Tr	Sst	lse Sd a.a., f – m, else a.a.	
	Tr	Ls	gry wh, sft – frm, micr, arg	
	Tr	Pyr	nods	
3560	100	Clst	occ mod frm – hd, occ micropyr, else a.a.	
	Tr	Ls	a.a.	
3570	100	Clst	olv gry, lt – dk gn gry, Tr m lt gry – m gry, sft – frm, amor – sbblky, pred sli calc	
	Tr	Sst	f – m, occ crs, else a.a.	
	Tr	Ls	a.a.	
3578			5 % Sd	Spot
3580	95	Clst	a.a.	
	5	Sst	a.a.	
3580			5 – 10 % Sd	Spot
3590	100	Clst	pred brn gry – olv gry, lt – dk gn gry, occ m gry, sft – frm, amor – sbblky, sli calc, occ mod calc, Tr micropyr	
	Tr	Ls	a.a., Tr yel brn, mod hd, microxln	
	Tr	Sst		
3600			a.a.	
3610	100	Clst	pred brn gry – olv gry, lt – dk gn gry, occ m gry, sft – frm, amor – sbblky, sli calc, occ mod calc, Tr micropyr, slty, loc vf sdy	

Depth (m RKB)	Lithology (%)	Lithological Description: Rock name, mod.lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed.structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
3620	100	Clst	pred brn gry – olv gry, lt – dk gn gry, occ m gry, sft – frm, amor – sbblky, sli calc, occ mod calc, Tr micropyr, slty, loc vf sdy	
	Tr	Ls	gry wh, sft – frm, micr, arg	
3630	100	Clst	brn gry – dusky brn, olv gry, occ m gry, sft – frm, amor – sbblky, non – sli calc, Tr micropyr, r Glauc, slty, loc vf sdy	
	Tr	Ls	gry wh, loc pa yel brn, sft – frm, loc mod hd, micr, arg	
3640			a. a.	
3650	100	Clst	a. a. also r micromic	
	Tr	Ls	a. a.	
3660	100	Clst	pred brn gry – dusky brn, else a. a.	
	Tr	Ls	a. a.	
3670	100	Clst	brn gry – dusky brn, Tr olv gry – gry, sft – frm, blky – sbblky, non – sli calc, Tr Micropyr, slty, Tr vf sdy	
	Tr	Ls	lt gry – gry wh, frm – mod hd, loc arg, micr	
	r	Sst	lt gry, clr – trnsl Qtz, vf, mod hd, sbang – sbrndd, w srt, w calc/sil cmt, Tr Micropyr, n.v.p.	No Shows
3680	100	Clst	occ slty, i.p. mod – v calc, occ stky, else a.a.	
	Tr	Ls	micr, else a.a.	
	Tr	Sst	lse Sd, m, sbrndd	
3690	100	Clst	Tr lt gn gry, else a.a.	
	Tr	Ls	r yel brn, mod hd, microxln, else a.a.	
	Tr	Pyr	nods	
3700	100	Clst	sli calc, occ mod calc, else a.a.	
	Tr	Ls	wh – gry wh, lt yel brn, sft – frm, micr, occ arg	
3710	100	Clst	a.a.	
	Tr	Sst	lse clr – trnsl Qtz, m – crs, sbrndd	
	Tr	Pyr	nods	
3720	95	Clst	pred sli calc, else a.a.	
	5	Ls	a.a.	
	Tr	Sst	a.a.	
3730	100	Clst	pred olv gry – olv blk, lt – dk gn gry, sft – frm, amor – blky, occ slty, occ stky, pred sli calc	
	Tr	Ls	wh – gry wh, lt yel brn, sft – frm, micr, occ arg	
	Tr	Sst	lse clr – trnsl Qtz, m – crs, sbrndd	
3740	100	Clst	a.a.	
	Tr	Ls	a.a.	

Country: Norway	Area: Møre Basin	Field: Tulipan
Well no: 6302/6-1	Company: Statoil ASA, Norske Shell A.S	
RKB: 25 meters	Geologist: Giskeødegaard, Greve	
Hole size: 12 1/4"	Cut solvent:	Date: 15.08.2005

Depth (m RKB)	Lithology (%)	Lithological Description: Rock name, mod.lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed.structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
3750	100	Clst	pred olv gry – olv blk, lt – dk gn gry, sft – frm, amor – blky, occ slty, occ stky, mod calc	
	Tr	Ls	wh – gry wh, lt yel brn, sft – frm, micr, occ arg	
3760	100	Clst	a.a.	
	Tr	Ls	r dk yel brn, mod hd, microxln, else a.a.	
3770			pred a.a.	
3780	100	Clst	a. a.	
	Tr	Ls	a. a. loc grad Dol	
	Tr	Sst	lse clr – trnsl Qtz, m – crs, sbrndd	
3790	90	Clst	a. a.	
	10	Sst	lt gry, clr – trnsl Qtz, vf – f, Tr m, lse, occ fri, sbang – sbrndd, mod – w srtd, gen no cmt, loc sil cmt, n.v.p.	No Shows
	Tr	Ls	a.a.	
3795	100	Clst	a. a.	Spot
	Tr	Ls	a. a.	
3800	100	Clst	olv gry – olv blk, brn gry – dusky yel brn, Tr lt gry, blky – sbblky, sft – mod hd, calc – loc v calc, loc slty, Tr micropyr	
	Tr	Ls	a. a.	
3810	100	Clst	a. a.	
	Tr	Ls	a. a.	
3813			v calc, else a.a.	Spot
3820	100	Clst	olv gry – olv blk, brn gry – dusky yel brn, Tr lt gry, blky – sbblky, sft – mod hd, calc – v calc, loc slty, Tr micropyr	
	Tr	Ls	gry wh – lt gry, loc pa yel brn, blky, sft – mod hd, loc hd, Tr arg, micr i.p., loc xln grad Dol	
3827	100	Clst	a. a.	Spot
	Tr	Sst	lt gry – m gry, clr – trnsl Qtz, vf – f, Tr crs lse gn, mod hd, sbang – sbrndd, mod srtd, calc/sil cmt, Tr Glauc, n.v.p.	No Shows
	Tr	Ls	a. a.	
3830	100	Clst	a. a. loc vf sdy	
	Tr	Ls	a. a.	
3839	90	Clst	a. a. loc v Mic, vf sdy, v slty grad Sltst	
	10	Sst	lt gry, clr – trnsl Qtz, vf – f, Tr m – crs lse Qtz gn, mod hd – hd, sbang – sbrndd, mod srtd, calc cmt, Tr sil cmt, Tr Glauc, r Mic, n.v.p.	No Shows
3842	100	Clst	olv gry – olv blk, brn gry – dusky yel brn, Tr lt gry, blky – sbblky, sft – mod hd, calc – v calc, loc slty, Tr micropyr	
	Tr	Sst	lt gry, clr – trnsl Qtz, vf – f, Tr m – crs lse Qtz gn, mod hd – hd,	No Shows

WELLSITE SAMPLE DESCRIPTION			Page 16 of 27
Country: Norway	Area: Møre Basin	Field: Tulipan	
Well no: 6302/6-1	Company: Statoil ASA, Norske Shell A.S		
RKB: 25 meters	Geologist: Giskeødegaard, Greve		
Hole size: 12 1/4”	Cut solvent:	Date: 15.08.2005	

Depth (m RKB)	Lithology (%)	Lithological Description: Rock name, mod.lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed.structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
		sbang – sbrndd, mod srtd, calc cmt, Tr sil cmt, Tr Glauc, r Mic, n.v.p.	
	Tr	Ls	gry wh – lt gry, loc pa yel brn, blky, sft – mod hd, loc hd, Tr arg, micr i.p., loc xln, grad Dol i.p.	
			TD of 12 ¼” section @ 3842 m	

Depth (m RKB)	Lithology (%)	Lithological Description: Rock name, mod.lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed.structures, accessories, fossils, porosity, contamination		Remarks: Shows, cavings, mud additives, etc.
3846	100	Cmt		
3849	100	Clst	m dk gry – dk gry, sft – frm, sbblky, stky, i.p. v f sdy – slty, calc – v calc	
	Tr	Sst	lse, clr – trnsl Qtz, also yel – smky, v f – f, sbrnd – rnd, wl srtd	
3852	100	Clst	mafic min, occ microglauc, else a.a.	
	Tr	Ls	wh – lt yel wh, sbblky – blky, sft – frm	
	Tr	Sst	a.a.	
3855	100	Clst	a.a.	
	Tr	Ls	a.a.	
	Tr	Sst	a.a.	
3858	a.a.			
3861	a.a.			
3864	100	Clst	micropyr, else a.a.	
	gd Tr	Ls	microglauc, micropyr, sucr, else a.a.	
3867	a.a.			
3870	100	Clst	m dk gry – dk gry, sft – frm, slily stky i.p., v f sdy – slty i.p., sbblky, micropyr, occ microglauc, occ mafic min	
	Tr	Ls	wh – lt yel wh, sbblky – blky, sft – frm, sucr, microglauc, micropyr	
3873	a.a.			
3876	a.a.			
3879	a.a.			
3882	100	Clst	a.a.	
	Tr	Ls	a.a.	
	Tr	Sst	wh – trnsl Qtz, hd – v hd, v f, wl srtd, sbang, micropyr, microglauc, calc cmt, sil cmt ?	
3885	100	Clst	m – dk gry, sft, amor – blky, sli slty, Tr vf snd, mod calc, Tr Glauc, Tr microcarb	
	Tr	Sst	a.a.	
3888	100	Clst	a.a.	
	Tr	Sst	a.a.	
	Tr	Ls	crm, sft – frm, blky, micr, sl arg	
3891	100	Clst	lt – dk gy, occ sndy, a.a.	
	Tr	Ls	a.a.	
3894	100	Clst	m – dk gy, a.a.	
	Tr	Sst	vf – f, lse, sbang – rnd	

Depth (m RKB)	Lithology (%)	Lithological Description: Rock name, mod.lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed.structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
3897		Missed due to fast ROP	
3900	80	Clst	m – dk gry, sft, amor, occ blky, stcky, sli slty, sli sndy, mod calc	
	20	Sst	lse, vf – f, Tr m, sbang – sbrnd, sbelong – spher, w srt, glauc, occ blk Rk Frags	No shows
3903	80	Clst	a.a.	
	20	Sst	f – m, a.a.	
3904.5	85	Clst	m – dk gry, sft – hd, sbblky – blky, occ stky, n – mod calc, sli slty, vf sdy, micromic, Tr Pyr	Samples circ from core
	10	Ls	wh – lt yel gry, lt brn gry, sft – frm, micropyr, microglauc, sbplty – sbblky	(spot sample)
	5	Sst	lse, clr – trnsl Qtz, vf – f, occ m, occ Rk Frags, sbang – sbrnd, w srt, occ sil cmt, n calc	No shows
3906	80	Sst	lse, f, occ m, rr crs, abd Barite contam, a.a.	a.a.
	20	Clst	a.a.	
3909	50	Sst	Tr Pyr, a.a.	a.a.
	50	Clst		
	Tr	Ls	lt brn, dol, a.a.	
3912	70	Clst	a.a.	
	20	Sst	a.a.	a.a.
	10	Ls	a.a.	
			Core #1: Cored interval 3903 – 3911.6m recovered – 3910.9m – 7.9m=92%	
			For descriptions see Core desc – core#1.ppt	
3915	70	Sst	lse, clr Qtz, occ mlky wh, m, occ c–v c, occ f, sbang, occ ang – rnd, pr – mod srt, pyr	a.a.
	30	Clst	m – dk gry, occ dk grn gry – olv gry hd, brit, calc	
3918	90	Sst	vf – f, occ m, a.a.	a.a.
	10	Clst	a.a.	
			Core #2: Cored interval 3911.6–3918.5m, recovered – 3916.3 – 4.7m=68%	
			For descriptions see Core desc – core#2.ppt	
			Core end depth adjusted – 3916m	
3918	80	Sst	lse, clr Qtz, f – m, occ c, sbang – sbrnd, occ ang – rnd, mod – gd srt, Tr Glauc	a.a.
	20	Clst	m gry, sft, amor, occ blky, stcky, sli slty, sli sndy, mod calc	
3921	100	Sst	a.a., v f – f, Tr m	a.a.
	Tr	Clst	a.a.	

Country: Norway	Area: Møre Basin	Field: Tulipan
Well no: 6302/6-1	Company: Statoil ASA, Norske Shell A.S	
RKB: 25 meters	Geologist: Rasmussen, Wayne, de Lesquen, Bøe, Johnsen	
Hole size: 8 1/2"	Cut solvent:	Date: 26.08-15.09.2005

Depth (m RKB)	Lithology (%)	Lithological Description: Rock name, mod.lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed.structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
3924	70	Sst	lse, clr Qtz, vf – f, occ m - c, sbang – sbrnd, occ ang – rnd, mod – gd srt, Tr Glauc	No shows
	30	Clst	m gry, sft, amor, occ blky, stcky, sli slty, sli sndy, mod calc	
3927	90	Sst	a.a.	a.a.
	10	Clst	a.a.	
3930	90	Sst	a.a.	a.a.
	10	Clst	a.a.	
3933	90	Sst	a.a.	a.a.
	10	Clst	a.a.	
3936	100	Sst	a.a.	a.a.
3939	90	Sst	a.a., vf – m, occ crs, pr – mod srt	a.a.
	10	Clst	lt gry sft, amor	
3941,5	90	Sst	lse clr Qtz, occ grnsh, m – fn, abn crs, mod srt, sbang – sbrnd	a.a.
(BU)	10	Clst	a.a.	
		gd Tr	Pyr, Glauc	
3942	80	Sst:	clr – trnsl Qtz, lse, pred f – m, occ crs, mod – wl srt, sbang – sbrndd, Tr Pyr, Tr Glauc	a.a.
	20	Clst:	m dk gry – dk gry, sft – frm, occ stky, blky – amor, mic, v calc	
	Tr	Ls	wh – lt yel gry, lt brn gry, sft – frm, micropyr, sbblky	
3945	60	Clst	a.a.	
	40	Sst	a.a.	a.a.
3948	70	Clst	a.a.	
	30	Sst	a.a.	a.a.
3951	50	Clst	a.a.	
	50	Sst	a.a.	a.a.
3954	50	Clst	a.a.	
	50	Sst	a.a.	a.a.
3957	70	Sst	a.a.	a.a.
	30	Clst	a.a.	
3960	90	Sst	clr – trnsl Gr, lse, pred f – m, mod - wl srt, sbrndd, Tr glauc	a.a.
	10	Clst	a.a.	
3963	50	Sst	a.a.	a.a.
	50	Clst	a.a.	

Depth (m RKB)	Lithology (%)	Lithological Description: Rock name, mod.lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed.structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
3966	90	Sst	clr – trnsl Gr, lse, pred f – m, mod - wl srt, sbrndd, Tr glauc	No shows
	10	Clst	m dk gry – dk gry, sft – frm, occ stky, blky – amor, mic, v calc	
3969	90	Sst	a.a.	a.a.
	10	Clst	a.a.	
	Tr	Ls	wh – lt gry, sft – frm, sbblky, glauc i.p.	
3972	60	Sst	a.a.	a.a.
	40	Clst	a.a.	
3975	80	Sst	a.a., Tr Pyr	a.a.
	20	Clst	m dk gry – olv gry, sft – frm, stky, amor, glauc, mod calc	
3978	80	Sst	a.a.	a.a.
	20	Clst	a.a.	
3981	60	Clst	a.a.	a.a.
	40	Sst	a.a.	
	Tr	Ls	lt gry – lt brnsh gry, frm, crmbly, glauc i.p.	
3984	60	Clst	a.a.	a.a.
	40	Sst	a.a.	
	Tr	Ls	a.a.	
3987	80	Sst	clr – trnsl Qtz, lse, occ sil cmt, f – m, also crs, mod – wl srt, sbang – sbrndd, occ ang, Tr glauc, occ v glauc	a.a.
	20	Clst	m dk gry – dk gry, sft – frm, stky, amor, calc – v calc	
	Tr	Ls	a.a.	
	Tr	Glauc		
3990	80	Sst	v glauc, else a.a.	a.a.
	20	Clst	a.a.	
	Tr	Ls	a.a.	
	Tr	Glauc		
3993	90	Sst	a.a.	a.a.
	10	Clst	a.a.	
	Tr	Ls	a.a.	
	Tr	Glauc		
3996	80	Sst	v glauc, else a.a.	a.a.
	20	Clst	a.a.	
	Tr	Ls	a.a.	
	Tr	Glauc		
3999	90	Sst	a.a.	a.a.
	10	Clst	m dk gry – dk gry, sft – frm, stky, amor, calc – v calc	
	Tr	Ls	lt gry – lt brnsh gry, frm, crmbly, glauc i.p.	

Depth (m RKB)	Lithology (%)	Lithological Description: Rock name, mod.lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed.structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
	Tr	Glauc	
4002	90	Sst	clr – trnsl Qtz, lse, occ sil cmt, f – m, also crs, mod – wl srt, sbang – sbrndd, occ ang, Tr glauc, occ v glauc	No shows
	10	Clst	m dk gry – dk gry, sft – frm, stky, amor, calc – v calc	
	Tr	Ls	lt gry – lt brnsh gry, frm, crmbly, glauc i.p.	
	Tr	Glauc		
4005	60	Sst	a.a.	a.a.
	30	Clst	a.a.	
	10	Ls	lt gry – v lt gry, sft – frm, crmbly, sbblky	
	Tr	Glauc		
4008	60	Clst	m gry – m dk gry, sft, stky, amor, glauc i.p., v calc	
	40	Sst	clr – trnsl Qtz, f – m, also crs, occ v crs, mod srt, sbang – sbrndd, calc cmt i.p, glauc i.p	a.a.
	Tr	Ls	lt gry – v lt gry, sft – frm, crmbly, sbblky	
4011	60	Clst	a.a.	a.a.
	40	Sst	occ v crs, else a.a.	
	Tr	Ls	a.a.	
				a.a.
4014	70	Clst	a.a.	
	30	Sst	a.a.	a.a.
	Tr	Ls	a.a.	
4017	50	Clst	a.a.	
	40	Sst	calc cmt, also lse, else a.a.	a.a.
	10	Ls	a.a.	
4020	50	Clst	a.a.	
	40	Sst	a.a.	a.a.
	10	Ls	a.a.	
4023	60	Clst	a.a.	
	30	Sst	pred lse Gr, else a.a.	a.a.
	10	Ls	a.a.	
4026	100	Clst	a.a.	
	Tr	Sst	a.a.	a.a.
	Tr	Ls	a.a.	
4029	100	Clst	a.a.	
	Tr	Sst	a.a.	a.a.
	Tr	Ls	a.a.	
4032	60	Clst	m gry – m dk gry, sft, stky, amor, glauc i.p., v calc	

Depth (m RKB)	Lithology (%)	Lithological Description: Rock name, mod.lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed.structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
	30	Sst	clr – trnsl Qtz, f – m, also crs, occ v crs, mod srt, sbang – sbrndd, calc cmt i.p, alos lse, glauc i.p	No shows
	10	Ls	lt gry – v lt gry, sft – frm, crmbly, sbblky	
4035	50	Clst	a.a.	
	40	Sst	mic, else a.a.	a.a.
	10	Ls	a.a.	
4038	80	Clst	a.a.	
	10	Sst	no mic, else a.a.	a.a.
	10	Ls	a.a.	
4041	90	Clst	also grysh blk, frm, sbfis, else a.a.	
	10	Ls	a.a.	
	Tr	Sst	a.a.	a.a.
4044	80	Clst	m dk gry – dk gry, sft – frm, stky, amor –sbblky, v calc, glauc i.p.	a.a.
	20	Sst	clr – trnsl Qtz, lse, occ calc cmt, pred f, occ m – crs, wl srt, sbang – sbrndd, glauc i.p.	
	Tr	Ls	lt gry, lt brnsh gry – brnsh gry, frm, sbblky, crmbly	
4047	50	Sst	a.a.	a.a.
	40	Clst	a.a.	
	10	Ls	a.a.	
4050	90	Clst	a.a.	
	10	Sst	a.a.	a.a.
	Tr	Ls	a.a.	
4053	80	Clst	a.a.	
	10	Sst	a.a.	a.a.
	10	Ls	a.a.	
4056	60	Sst	a.a.	
	40	Clst	a.a.	a.a.
	Tr	Ls	a.a.	
4059	60	Clst	a.a.	
	40	Sst	a.a.	a.a.
	Tr	Ls	a.a.	
	Tr	Pyr		
4062	60	Clst	a.a.	
	40	Sst	a.a.	a.a.
	Tr	Ls	a.a.	
4065	60	Clst	a.a.	
	40	Sst	a.a.	a.a.
	Tr	Ls	lt gry, lt brnsh gry – brnsh gry, frm, sbblky, crmbly	

Country: Norway	Area: Møre Basin	Field: Tulipan
Well no: 6302/6-1	Company: Statoil ASA, Norske Shell A.S	
RKB: 25 meters	Geologist: Rasmussen, Wayne, de Lesquen, Bøe, Johnsen	
Hole size: 8 1/2”	Cut solvent:	Date: 26.08-15.09.2005

Depth (m RKB)	Lithology (%)	Lithological Description: Rock name, mod.lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed.structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
4068	60	Sst	clr – trnsl Qtz, f – m, lse, occ crs, wl srt, sbang – sbrndd, abd Glauc	No shows
	40	Clst	m dk gry – dk gry, sft – frm, stky, amor –sbblky, v calc, glauc i.p.	
	Tr	Ls	lt gry, lt brnsh gry – brnsh gry, frm, sbblky, crmbly	
4071	60	Sst	clr – trnsl Qtz, pred lse, m, occ crs, wl srt, sbang – sbrndd, occ calc cmt, abd Glauc	a.a.
	30	Clst	a.a.	
	10	Ls	v lt gry – lt gry, sft – frm, sbblky, crmbly, glauc i.p.	
4074	60	Ls	v lt gry, sft – frm, blky – sbblky, crmbly	
	30	Sst	f – m, else a.a.	a.a.
	10	Clst	a.a.	
4077	70	Ls	a.a.	
	20	Clst	a.a.	
	10	Sst	a.a.	a.a.
4080	80	Ls	v lt gry, sft – frm, blky – sbblky, crmbly	
	20	Clst	m dk gry – dk gry, sft – frm, stky, amor –sbblky, v calc, glauc i.p.	
	Tr	Sst	clr – trnsl Qtz, lse, occ calc cmt, f – m, occ crs, wl srt, sbang – sbrndd, glauc i.p.	a.a.
4083	70	Ls	a.a.	
	30	Clst	a.a.	
	Tr	Sst	a.a.	a.a.
4086	50	Clst	a.a.	
	30	Ls	a.a.	
	20	Sst	loc v calc cmt, else a.a.	a.a.
4089	60	Clst	a.a.	
	20	Ls	a.a.	
	20	Sst	a.a.	a.a.
	Tr	Glauc		
4092	40	Clst	a.a.	
	30	Ls	a.a.	
	30	Sst	a.a.	a.a.
4095	90	Ls	a.a.	
	10	Clst	a.a.	
	Tr	Sst	a.a.	a.a.
4098	90	Ls	a.a.	
	10	Clst	a.a.	
	Tr	Sst	a.a.	a.a.

STATOIL

WELLSITE SAMPLE DESCRIPTION			Page 24 of 27
Country: Norway	Area: Møre Basin	Field: Tulipan	
Well no: 6302/6-1	Company: Statoil ASA, Norske Shell A.S		
RKB: 25 meters	Geologist: Rasmussen, Wayne, de Lesquen, Bøe, Johnsen		
Hole size: 8 1/2"	Cut solvent:	Date: 26.08-15.09.2005	

Depth (m RKB)	Lithology (%)	Lithological Description: Rock name, mod.lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed.structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
4101	60	Ls	v lt gry, sft – frm, blky – sbblky, crmbly	
	20	Sst	clr – trnsl Qtz, lse, occ calc cmt, f – m, occ crs, wl srt, sbang – sbrndd, glauc i.p.	No shows
	20	Clst	m dk gry – dk gry, sft – frm, stky, amor –sbblky, v calc, glauc i.p.	
4104	50	Ls	a.a.	
	30	Sst	a.a.	a.a.
	20	Clst	a.a.	
4107	60	Ls	a.a.	
	30	Clst	a.a.	
	10	Sst	a.a.	a.a.
4110	80	Ls	pred sft &crmbly, slily arg, else a.a.	
	20	Clst	a.a.	
	Tr	Sst	a.a.	a.a.
4113	90	Ls	a.a.	
	10	Clst	a.a.	
	Tr	Sst	a.a.	a.a.
4116	90	Ls	v lt gry – lt gry, sft – frm, blky – sbblky, crmbly, glauc i.p.	
	10	Clst	m dk gry – dk gry, sft, amor, stky, v calc	
	Tr	Sst	clr – trnsl Qtz, lse, pred f, occ m – crs, wl srt, sbang – sbrndd	a.a.
4119	60	Ls	a.a.	
	20	Clst	a.a.	
	20	Sst	a.a.	a.a.
4122	70	Ls	a.a.	
	20	Sst	a.a.	a.a.
	10	Clst	a.a.	
4125	lost			
4128	100	Ls	a.a.	
	Tr	Clst	a.a.	
	Tr	Sst	a.a.	a.a.
4131	100	Ls	a.a.	
	Tr	Clst	a.a.	
	Tr	Sst	a.a.	a.a.
4134	100	Ls	a.a.	
	Tr	Clst	a.a.	
	Tr	Sst	a.a.	a.a.

WELLSITE SAMPLE DESCRIPTION			Page 25 of 27
Country: Norway	Area: Møre Basin	Field: Tulipan	
Well no: 6302/6-1	Company: Statoil ASA, Norske Shell A.S		
RKB: 25 meters	Geologist: Rasmussen, Wayne, de Lesquen, Bøe, Johnsen		
Hole size: 8 1/2”	Cut solvent:	Date: 26.08-15.09.2005	

Depth (m RKB)	Lithology (%)	Lithological Description: Rock name, mod.lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed.structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
4137	100	Ls	v lt gry – lt gry, sft – frm, blky – sbblky, crmbly, glauc i.p.	
	Tr	Clst	m dk gry – dk gry, sft, amor, stky, v calc	
	Tr	Sst	clr – trnsl Qtz, lse, pred f, occ m – crs, wl srt, sbang – sbrndd	No shows
4140	100	Ls	a.a.	
	Tr	Clst	a.a.	
	Tr	Sst	a.a.	a.a.
4143	70	Ls	a.a.	
	20	Clst	a.a.	
	10	Sst	a.a.	a.a.
	Tr	Pyr		
4146	40	Clst	a.a.	
	30	Ls	a.a.	
	30	Sst	a.a.	a.a.
	Tr	Pyr		
4149	40	Clst	a.a.	
	30	Ls	a.a.	
	30	Sst	a.a.	a.a.
	Tr	Pyr		
4152	40	Clst	a.a.	
	40	Sst	clr – trnsl Qtz, lse, pred f, occ m – crs, wl srt, sbang – sbrndd, abd Glauc	a.a.
	20	Ls 1	v lt gry – lt gry, sft – frm, blky – sbblky, crmbly, glauc i.p.	
	Tr	Ls 2	m gry – brnsh gry, frm, blky, crmbly, arg i.p.	
	Tr	Pyr		
4155	60	Clst	a.a.	
	20	Sst	a.a.	a.a.
	20	Ls 1	a.a.	
	Tr	Ls 2	a.a.	
	Tr	Pyr		
4158	60	Clst	a.a.	
	30	Sst	clr – trnsl Gr, lse, pred f – m, occ crs, wl – mod srt, sbang – sbrndd, abd Glauc, mic	a.a.
	10	Ls	v lt gry – lt gry, sft – frm, blky – sbblky, crmbly, glauc i.p.	
4161	70	Clst	a.a.	
	20	Sst	a.a.	a.a.
	10	Ls	a.a.	
4164	70	Clst	a.a.	
	20	Sst	a.a.	a.a.
	10	Ls	a.a.	

Country: Norway	Area: Møre Basin	Field: Tulipan
Well no: 6302/6-1	Company: Statoil ASA, Norske Shell A.S	
RKB: 25 meters	Geologist: Rasmussen, Wayne, de Lesquen, Bøe, Johnsen	
Hole size: 8 1/2”	Cut solvent:	Date: 26.08-15.09.2005

Depth (m RKB)	Lithology (%)	Lithological Description: Rock name, mod.lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed.structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
4167	70	Clst	m dk gry – dk gry, sft, amor, stky, v calc	
	20	Sst	clr – trnsl Gr, lse, pred f – m, occ crs, wl – mod srt, sbang – sbrndd, abd Glauc, mic	No shows
	10	Ls	v lt gry – lt gry, sft – frm, blky – sbblky, crmbly, glauc i.p.	
	Tr	Glauc		
4170	80	Clst	gen v stky, else a.a.	
	10	Sst	a.a.	a.a.
	10	Ls	a.a.	
	Tr	Glauc		
	Tr	Pyr	Nodules	
4173	90	Clst	a.a.	
	10	Sst	a.a.	a.a.
	Tr	Ls	a.a.	
4176	90	Clst	a.a.	
	10	Sst	a.a.	a.a.
	Tr	Ls	a.a.	
4179	100	Clst	a.a.	
	Tr	Sst	a.a.	a.a.
	Tr	Ls	a.a.	
4182	100	Clst	calc, else a.a.	
	Tr	Ls	v lt gry – lt gry, sft – frm, blky – sbblky, crmbly	
	Tr	Sst	clr – trnsl Qtz, lse, pred f, occ m – crs, wl srt, sbang – sbrndd	a.a.
	Tr		Pyr, Glauc	
4185	100	Clst	a.a.	
	Tr	Ls	a.a.	
	Tr	Sst	a.a.	a.a.
4188	lost			
4191	100	Clst	glauc i.p., else a.a.	
	Tr	Ls	a.a.	
	Tr	Sst	a.a.	a.a.
4194	100	Clst	a.a.	
	Tr	Ls	a.a.	
	Tr	Sst	a.a.	a.a.
4197	90	Clst	a.a.	
	10	Sst	a.a.	a.a.
	Tr	Ls	a.a.	

WELLSITE SAMPLE DESCRIPTION			Page 27 of 27
Country: Norway	Area: Møre Basin	Field: Tulipan	
Well no: 6302/6-1	Company: Statoil ASA, Norske Shell A.S		
RKB: 25 meters	Geologist: Rasmussen, Wayne, de Lesquen, Bøe, Johnsen		
Hole size: 8 1/2”	Cut solvent:	Date: 26.08-15.09.2005	

Depth (m RKB)	Lithology (%)	Lithological Description: Rock name, mod.lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed.structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
4200	70	Clst	m dk gry – dk gry, sft, amor, gen v stky, calc, glau i.p.	Poor hole cleaning due – sticky/reactive Clst. Sst fraction probably not representative for this interval.
	30	Sst	clr – trnsl Qtz, lse, pred f, occ m, wl srt, sbang – sbrndd	No shows
	Tr	Ls	v lt gry – lt gry, sft – frm, blky – sbblky, crmbly	
	Tr		Pyr, Glauc	
4203	60	Clst	a.a.	No shows
	40	Sst	a.a.	
	Tr	Ls	a.a.	
4206	60	Clst	a.a.	a.a.
	40	Sst	a.a.	
	Tr	Ls	a.a.	
4209	50	Clst	a.a.	a.a.
	50	Sst	a.a.	
	Tr	Ls	a.a.	
	Tr	Glauc		
4212	50	Clst	occ gnsh gry, else a.a.	a.a.
	50	Sst	a.a.	
	Tr	Ls	a.a.	
4215	50	Clst	a.a.	a.a.
	50	Sst	a.a.	
4218	90	Clst	a.a.	Poor hole cleaning due – sticky/reactive Clst. Sst fraction probably not representative for this interval.
	10	Sst	a.a.	a.a.
4221	100	Clst	a.a.	a.a.
	Tr	Sst	a.a.	
4224	100	Clst	a.a.	a.a.
	Tr	Sst	a.a.	
4227	100	Clst	brnsh gry, dk gry – gnsh gry, sft, stky, amor, calc	a.a.
	Tr	Sst	a.a.	
4230	100	Clst	a.a.	a.a.
	Tr	Sst	a.a.	
			Well TD at 4230mMD (drillers depth)	

STATOIL

SIDEWALL CORE DESCRIPTION

Country: Norway	Area: Norwegian Sea	Field: Tulipan
Well no: 6302/6-1	Company: Statoil ASA, Norske Shell A.S, British Gas	
RKB: 25 meters	Geologist: O.Giskeødegaard/L.Rasmussen/S.Greve	
Hole size: 12 1/4 "	Cut solvent: Iso Propyl Alcohol	Date: 19.08.2005
Run no.: 2A	Reference log: PEX-DSI-HRLA	

Shot no.	Depth (mRKB)	Recov. (mm)	Lithological Description: Rock name, mod.lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed.structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
Only minor fragments of the sidewall cores have been described.				
1	3436,5	45	Clst	olv gry – lt bl gry, blk specs, mod hd, amor, wxy, calc, Tr slty, micropyr	
2	3540	45	Clst	olv gry – lt gry, lt bl gry, mod hd, non – sli calc, r slty, micropyr	
3	3544	47	Clst	dk gry – olv blk – olv gry, brn gry, mod hd, sbfis, non calc, Tr micropyr, sli slty, r micromic	
4	3578,5	48	Clst	olv gry – lt gry, mod hd, loc wxy, sli calc – calc, Tr micromic, r micropyr, slty, r v f sdy	
5	3610	46	Clst	dusky yel brn – brn blk, mod hd, non calc, slty, micropyr, Tr micromic	
6	3659,5	46	Clst	dusky yel brn – brn gry, mod hd – hd, loc dolomitic, else a. a.	
7	3790	49	Clst	yel brn – brn gry, v hd, blky, wxy, v calc, Tr micropyr, loc dolomitic	
8	3810.5	50	Clst	pl yel brn – brn gry, v hd, calc – v calc, Tr micropyr, slty, Tr v f sdy	
9	3826,5	51	Sltst	dusky yel brn, v hd, calc – v calc, Tr micropyr, arg Grad Clst, Tr Glauc, v f sdy Grad Sst	No Shows
10	3810	EMPTY			
11	3802	EMPTY			
12	3662	EMPTY			
13	3626,8	47	Sltst/Sst	med dk gry – dk gry, v hd, calc – v calc, arg grad Clst, tr microglauc, v f grad Sst, clr – transl Qtz, wl srtd, ang – sbang, tr mafic min	No shows
14	3548,8	EMPTY			
15	3524,5	30	Sst	clr – transl Qtz, grn gry – dk grn gry, v f, wl srtd, ang – sbang, v hd, calc – v calc, tr micropyr, tr microglauc, tr mafic min	No shows
16	3515	40	Sltst/Sst	dk grn gry – dk gry, v hd, locally grad v f Sst, tr micropyr, tr microglauc, calc	No shows
17	3485,5	CRUSH	Sltst/Sst	dk grn gry – dk gry, v hd, grad v f Sst, occ med, tr micropyr, tr microglauc, calc	No shows
18	3472	30	Sltst/Sst	dk grn gry – dk gry, mod hd, grad v f Sst, wl srtd, ang – sbang, tr micropyr, tr microglauc, calc	No shows

STATOIL

SIDEWALL CORE DESCRIPTION					Page 2 of 8
Country: Norway		Area: Norwegian Sea		Field: Tulipan	
Well no: 6302/6-1		Company: Statoil ASA, Norske Shell A.S, British Gas			
RKB: 25 meters		Geologist: O.Giskeødegaard/L.Rasmussen/S.Greve			
Hole size: 12 1/4 "		Cut solvent: Iso Propyl Alcohol		Date: 19.08.2005	
Run no.: 2A		Reference log: PEX-DSI-HRLA			

Shot no.	Depth (mRKB)	Lithological Description: Recov. (mm)	Lithological Description: Rock name, mod.lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed.structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
19	3409,8	50	Sltst	dk grn gry – dk gry, hd – v hd, grad Clst, tr micropyr, tr microglauc, calc	No shows
20	3395,5	47	Sst	clr – transl Qtz, dk grn gry – dk gry, hd – v hd, f – v f, wl srtd, ang – sbang, hd – v hd, microglauc, tr micropyr, calc – v calc	No shows
21	3313	16	Clst	med dk gry – dk gry, v hd, tr micropyr, calc	
22	3214,5	CRUSH	Sltst/Sst	dk grn gry – dk gry, v hd, grad v f Sst, micropyr, microglauc, calc	No shows
23	3210	EMPTY			
24	3188	44	Clst	brn gry – brn blk, hd, tr microglauc, tr micropyr, slily calc	
25	3124,8	EMPTY			

STATOIL

SIDEWALL CORE DESCRIPTION				Page 3 of 8
Country: Norway	Area: Norwegian Sea		Field: Tulipan	
Well no: 6302/6-1	Company : Statoil ASA, Norske Shell A.S			
RKB: 25 meters	Geologist: B.Kjellin			
Hole size: 8 1/2 "	Cut solvent: Acetone		Date: 20.09.2005	
Run no.: 3B	Reference log: PEX-DSI-HRLA			

Shot no.	Depth (mRKB)	Recov. (mm)	Lithological Description: Rock name, mod.lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed.structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
Only minor fragments of the sidewall cores have been described.				
1	3939	45	Sst	olv gry – bnsh gry – m dk gry, clr – trnsl Qtz, f – m, mod srt, mod hd, sbang – sbrndd, arg Mtrx, r calc cmt, abd Mica, Tr Glauc, n.v.p.	no stain, no odour, no fl slow – w slow blue whi cloudy cut flu, dull – pa yel wh flu res ring
2	3938	38	Sst	lt olv gry – olv gry, clr – trnsl Qtz, f – m, mod srt, firm, sbang – sbrndd, Tr arg/Kao Mtrx, abd Glauc, Tr Mica	shows a.a
3	3937	40	Sst	a.a	shows a.a
4	3926	47	Clst	dk gry, hd, non calc, slily slty, Tr micropyr, Tr Mica, Tr Glauc	
5	3922	37	Sst	lt olv gry – olv gry, olv gry – m dk gry, clr – trnsl Qtz, vf – f, mod srt, firm, sbrndd – rndd, r calc cmt, arg/Kao Mtrx, i.p. slty, Tr Mica, Tr Glauc	shows a.a
6	3921	35	Clst	dk gry, hd, non calc, Tr Mica, Tr Glauc	
7	3915	50	Sst	lt olv gry, clr – trnsl Qtz, vf – f, occ m, mod srt, hd, sbang – sbrndd, abd calc cmt, abd Glauc, Tr Mica, n.v.p.	shows a.a
8	3914	40	Clst	dk gry – olv blk, hd – v hd, non calc, slily slty, Tr Mica, Tr Glauc	
9	3903	44	Sst	lt olv gry, clr – trnsl Qtz, f – m, mod srt, lse – firm, sbang – sbrndd, r calc cmt, Tr arg/Kao Mtrx, abd Glauc, r Mica, n.v.p.	shows a.a
10	3902.5	48	Sst	a.a	shows a.a
11	3901	49	Clst	dk gry, hd, calc – v calc, Tr Mica, Tr Glauc	
12	3997	46	Sst	olv gry – lt olv gry, clr – trnsl Qtz, vf – f, mod srt, lse – firm, sbang – sbrndd, Tr calc cmt, Kao/arg Mtrx, abd Glauc, Tr Mica, n.v.p.	shows a.a
13	3995.5	47	Sst	a.a but abd calc cmt	shows a.a
14	3978	48	Sst	olv gry – m dk gry, clr – trnsl Qtz, vf – f, pr – mod srt, lse – firm, sbang – sbrndd, slty, arg Mtrx, Tr Glauc, Tr Mica, n.v.p.	shows a.a
15	3971	44	Sst	lt olv gry, clr – trnsl Qtz, f – m, mod srt, lse – firm, sbang – sbrndd, r calc cmt, arg/Kao Mtrx, abd Glauc, Tr Mica, n.v.p.	shows a.a
16	3970	43	Sst	a.a	shows a.a
17	3969	43	Sst	a.a but Tr calc cmt	shows a.a

SIDEWALL CORE DESCRIPTION			Page 4 of 8
Country: Norway	Area: Norwegian Sea	Field: Tulipan	
Well no: 6302/6-1	Company : Statoil ASA, Norske Shell A.S		
RKB: 25 meters	Geologist: B.Kjellin		
Hole size: 8 1/2 "	Cut solvent: Acetone	Date: 20.09.2005	
Run no.: 3B	Reference log: PEX-DSI-HRLA		

Shot no.	Depth (mRKB)	Recov. (mm)	Lithological Description: Rock name, mod.lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed.structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
18	3968	-	-		
19	3967	42	Sst	lt olv gry, clr – trnsl Qtz, f – m, mod srt, lse – firm, sbang – sbrndd, tr – abd calc cmt, arg/Kao Mtrx, abd Glauc, Tr Mica, n.v.p.	shows a.a
20	3966	40	Sst	a.a	shows a.a
21	4098.5	47	Ls	yelsh gry – lt olv gry, hd, microxln	No shows
22	4097	50	Ls	a.a	No shows
23	4095	45	Ls	a.a also r Glauc	No shows
24	4093	46	Sst	lt olv gry – olv gry, clr – trnsl Qtz, f – m, mod srt, firm, sbang – sbrndd, abd calc cmt, gd Tr Glauc, Tr Mica, n.v.p.	No shows
25	4082	48	Clst	olv blk, hd, non calc, r carb Mtrl	
26	4079.5	50	Ls	yelsh gry – lt olv gry, hd, r slty, microxln	No shows
27	4077	46	Sst	lt olv gry – olv gry, clr – trnsl Qtz, f – m, mod srt, mod hd – hd, sbang – sbrndd, abd calc cmt, gd Tr Glauc, r Mica, n.v.p.	No shows
28	4070	40	Sst	lt gry – occ lt olv gry, clr – trnsl Qtz, f – m, mod srt, hd, ang – sbang, abd Sil? cmt, abd Mica, abd Glauc, n.v.p.	No shows
29	4069	47	Sst	a.a but abd calc cmt	No shows
30	4063	38	Clst	olv blk, hd, non calc, Tr Mica, Tr Glauc, r carb Mtrl	
31	4151.6	50	Clst	olv blk, hd, non calc, Tr Glauc, r Mica, r carb Mtrl, Tr micropyr	
32	4150.2	49	Sltst	lt gry – lt olv gry, gysh gn, slily calc, hd, i.p. vf sdy grad slty Sst, abd Pyr, abd Glauc	No shows
33	4142	47	Sst	lt gry – lt olv gry, clr – trnsl Qtz, f – m, mod srt, sbang – sbrndd, abd calc cmt, Tr Glauc, Tr Pyr, r carb Mtrl, n.v.p.	No shows
34	4141	45	Sst	a.a	No shows
35	4140.2	47	Sst	a.a but abd calc cmt grd vf sdy Ls	No shows
36	4138.5	46	Ls	yelsh gry – lt olv gry, hd – v hd, r vf sdy, microxln	No shows
37	4137.5	46	Ls	a.a	No shows
38	4135	41	Ls	a.a	No shows

STATOIL

SIDEWALL CORE DESCRIPTION			Page 5 of 8
Country: Norway	Area: Norwegian Sea	Field: Tulipan	
Well no: 6302/6-1	Company : Statoil ASA, Norske Shell A.S		
RKB: 25 meters	Geologist: B.Kjellin		
Hole size: 8 1/2 "	Cut solvent: Acetone	Date: 20.09.2005	
Run no.: 3B	Reference log: PEX-DSI-HRLA		

Shot no.	Depth (mRKB)	Lithological Description: Recov. (mm)	Lithological Description: Rock name, mod.lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed.structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
39	4131	42	Ls yelsh gry – lt olv gry, hd – v hd, r vf sdy, microxln	No shows
40	4128	45	Ls yelsh gry – lt olv gry, hd – v hd, microxln	No shows
41	4125	46	Ls a.a	No shows
42	4123	50	Ls a.a	No shows
43	4121	49	Clst olv blk, hd – v hd, slily calc, Tr micropyr, r carb Mtrl	
44	4118	42	Clst olv blk – olv gry, hd, calc, slty, i.p. vf sdy, Tr Glauc, Tr carb Mtrl	
45	4113.5	45	Ls yelsh gry – lt olv gry, hd, r vf sdy, microxln	No shows
46	4111	49	Ls yelsh gry – lt olv gry, hd – v hd, microxln	No shows
47	4105	50	Clst dk gry – olv blk, hd – v hd, calc, r carb Mtrl	
48	4218	-	-	
49	4209.5	42	Clst olv blk, hd, non calc, r carb Mtrl	
50	4176	43	Clst dk gry – olv blk, hd, non calc, r Glauc, r vf sdy	
51	4171.5	51	Clst dk gry – olv blk, hd – v hd, non calc, micromic, r carb Mtrl	

STATOIL

SIDEWALL CORE DESCRIPTION			Page 6 of 8
Country: Norway	Area: Norwegian Sea	Field: Tulipan	
Well no: 6302/6-1	Company: Statoil ASA, Norske Shell A.S		
RKB: 25 meters	Geologist: B.Kjellin		
Hole size: 8 1/2 "	Cut solvent: Acetone	Date: 21.09.2005	
Run no.: 3C	Reference log: PEX-DSI-HRLA		

Shot no.	Depth (mRKB)	Recov. (mm)	Lithological Description: Rock name, mod.lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed.structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
Only minor fragments of the sidewall cores has been described.				
1	4218.5	48	Clst	olv blk, hd, non calc, Tr micropyr, r Mic, r carb Mtrl	
2	4100.5	42	Clst	dk gry – olv blk, hd, slily calc, Tr Glauc, Tr vf sdy	
3	4087.5	49	Clst	olv blk, hd, non calc, r carb Mtrl	
4	4075.8	44	SSt	lt olv gry – olv gry, lt gry, clr – trnsl Qtz, f – m mod srt, mod hd – hd, sbang – sbrndd, abd calc cmt, Tr Glauc, r Mic, n.v.p.	no stain, no odour, no flu, slow – w slow blue white cloudy cut flu, dull – pale yel wh flu res ring
5	4072	-			
6	4059	48	Clst	olv blk, hd, non calc, Tr Mic, Tr Glauc	
7	4050.5	48	Clst	olv blk, hd – v hf, slily calc, r Glauc, r carb Mtrl	
8	4041	49	Clst	olv blk, hd – v hd, calc, Tr Glauc, Tr Mic	
9	4033	10	Clst	olv blk, hd – v hd, calc, Tr Mic, r micropyr	
10	4025	49	Clst	olv blk – olv gry, mod hd – hd, slily calc, r vf sdy, Tr Glauc, Tr Mic	
11	4018	50	Clst	olv blk, hd – v hd, calc, r slty, Tr Glauc, Tr Mic	
12	4006	48	Clst	olv blk, v hd, calc, Tr Mic, r carb Mtrl	
13	4001.7	45	Sst	lt olv gry – olv gry, clr – trnsl Qtz, vf – f, mod srt, lse - firm, sbang – sbrndd, r – Tr calc cmt, Kao/arg Mtrx, Tr Glauc, Tr Mic, n.v.p.	shows a.a
14	3994.2	50	Clst	olv blk, hd, slily calc, Tr Mic	
15	3980.5	46	Sst	lt olv gry – olv gry, clr – trnsl Qtz, vf – m, mod srt, lse - firm, sbang – sbrndd, r calc cmt, Kao/arg Mtrx, Tr Glauc, Tr Mic, n.v.p.	shows a.a
16	3980	47	Sst	a.a but firm – mod hd, Tr calc cmt	shows a.a
17	3968	40	Sst	lt olv gry, clr – trnsl Qtz, f - m, mod srt, lse - firm, sbang – sbrndd, r calc cmt, Kao/arg Mtrx, abd Glauc, Tr Mic, n.v.p.	shows a.a

STATOIL

SIDEWALL CORE DESCRIPTION			Page 7 of 8
Country: Norway	Area: Norwegian Sea	Field: Tulipan	
Well no: 6302/6-1	Company: Statoil ASA, Norske Shell A.S		
RKB: 25 meters	Geologist: B.Kjellin		
Hole size: 8 1/2 "	Cut solvent: Acetone	Date: 21.09.2005	
Run no.: 3C	Reference log: PEX-DSI-HRLA		

Shot no.	Depth (mRKB)	Recov. (mm)	Lithological Description: Rock name, mod.lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed.structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
18	3965	40	Sst: a.a	shows a.a
19	3964	47	Sst: a.a	shows a.a
20	3962.5	48	Sst/Sltst: Sst: a.a / Sltst olv gry, hd, non calc, r vf sdy, Tr Glauc, Tr Mic	shows a.a
21	3955.5	47	Sst: lt olv gry, clr – trnsl Qtz, vf – f, r m, mod srt, lse - firm, sbang – sbrndd, r calc cmt, Kao/arg Mtrx, gd Tr Glauc, n.v.p.	shows a.a
22	3952.2	46	Sst: a.a	shows a.a
23	3948	44	Clst: olv blk – dk gry, hd, non calc, slty, abd Mic, Tr Glauc, r micropyr	
24	3945	49	Clst: a.a	
25	3934.5	44	Sst: lt olv gry, clr – trnsl Qtz, vf – m, pred vf – f, mod srt, lse - firm, sbang – sbrndd, r – Tr calc cmt, Kao/arg Mtrx, gd Tr Glauc, Tr Mic, n.v.p.	shows a.a
26	3934	44	Sst: a.a	shows a.a
27	3933	50	Clst: gysh blk - olv blk, hd, non – slily calc, slty, i.p. vf sdy, Tr Glauc, Tr Mic, Tr carb Mtrl	
28	3932.2	50	Clst: a.a	
29	3927	47	Sst: lt olv gry, clr – trnsl Qtz, vf – f, mod srt, firm – mod hd, sbang – sbrndd, r calc cmt, Kao/arg Mtrx, Tr Glauc, Tr Mic, n.v.p.	no stain, no odour, no flu, slow – w slow blue white cloudy cut flu, pale - mod yel wh flu res ring
30	3926.5	43	Sst: a.a	shows a.a
31	3922	36	Sst: dk yelsh brn, clr – trnsl Qtz, vf – m, pr – mod srt, v hd, sbang – sbrndd , abd dol cmt, Sil? cmt, Tr Glauc, Tr Mic, n.v.p.	no shows
32	3921	43	Sst: lt olv gry, clr – trnsl Qtz, vf – f, mod srt, firm, sbang – sbrndd, no calc cmt, Kao/arg Mtrx, Tr Glauc, Tr Mic, n.v.p.	shows a.a
33	3907	46	Sst: lt olv gry , clr – trnsl Qtz, vf – f, mod srt, firm, sbang – sbrndd, r - Tr calc cmt, Kao/arg Mtrx, Tr Glauc, n.v.p.	shows a.a
34	3906.3	48	Sst: a.a also Tr Mic	shows a.a
35	3906	45	Sst: a.a but firm – mod hd, gd Tr calc cmt	shows a.a
36	3904.5	45	Sltst: olv blk, hd, slily calc, Tr vf sdy, Tr Glauc, abd Mic	shows a.a

STATOIL

SIDEWALL CORE DESCRIPTION					Page 8 of 8
Country: Norway		Area: Norwegian Sea		Field: Tulipan	
Well no: 6302/6-1		Company: Statoil ASA, Norske Shell A.S			
RKB: 25 meters		Geologist: B.Kjellin			
Hole size: 8 1/2 "		Cut solvent: Acetone		Date: 21.09.2005	
Run no.: 3C		Reference log: PEX-DSI-HRLA			

Shot no.	Depth (mRKB)	Lithological Description: Recov. (mm)	Lithological Description: Rock name, mod.lith, colour, grain size, sorting, roundness, matrix, cementation, hardness, sed.structures, accessories, fossils, porosity, contamination	Remarks: Shows, cavings, mud additives, etc.
37	3903.5	42	Sst	lt olv gry, clr – trnsl Qtz, f – m, mod srt, lse - firm, sbang – sbrndd, r calc cmt, Kao/arg Mtrx, Tr Glauc, n.v.p.	shows a.a
38	3901	45	Sst	lt olv gry, clr – trnsl Qtz, f – m, mod srt, mod hd, sbang – sbrndd, gd Tr calc cmt, Kao/arg Mtrx, Tr Glauc, Tr Mic, n.v.p.	shows a.a
39	3896	45	Clst	olv blk, hd, slily calc, skty – v slty, Tr Glauc, Tr Mic	
40	3881	-	-		
41	3864	-	-		

STATOIL

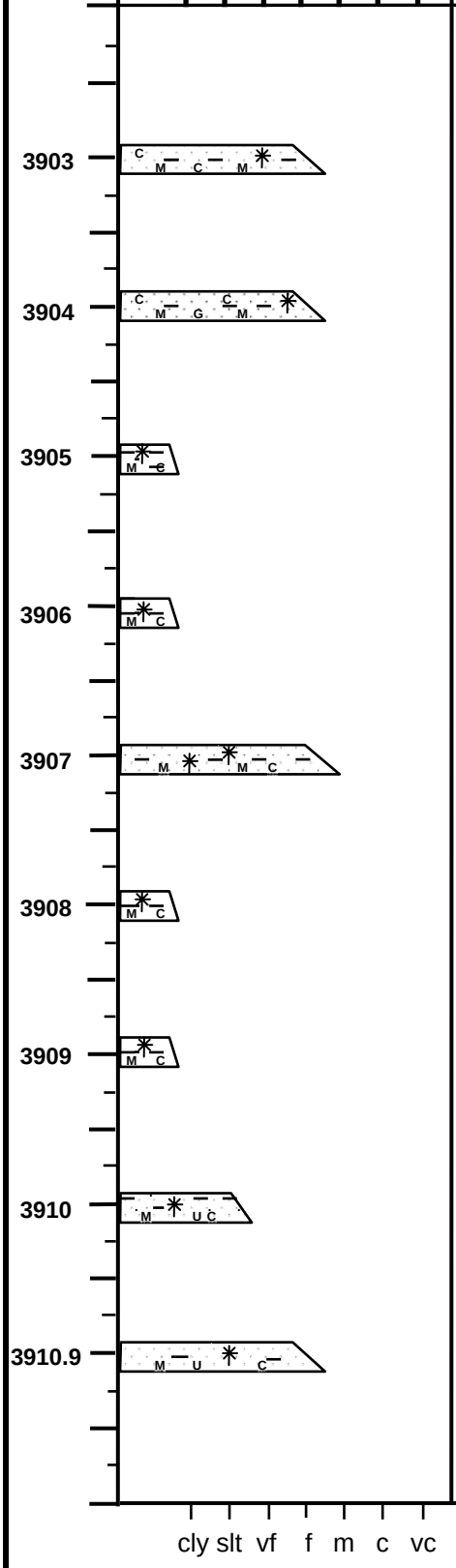
CONVENTIONAL CORE DESCRIPTION

Country: Norway | **Area:** Norwegian Sea | **Field:** Tulipan

Well no: 6302/6-1 | **Formation:** Tang Formation

Core no: 1 | **Interval:** 3903 – 3911.6 mMD* | **Cored:** 8.6 m **Rec:** 7.9 m 92 %

Core size: 4” | **Geologists:** L. Rasmussen, J. Wayne & C. de Lesquen | **Date**: 01.09.2005



Lithological Description Rock name, mod. lith., colour, grain size, sorting, roundness, matrix, cementation, hardness, sed. struct.,accessories, fossils, porosity, contamination	Remarks Shows, etc
SST: lt gry, grn spec, frm, crumb, clr - trnsl Qtz, f, occ m, sbang - sbrndd, sbspher, mod-wl srt, wk calc cmt, lt gry - wh arg (kaol) Mtrx, Mic, Glauc, pr – mod vis por.	No Show
SST: lt gry, grn spec, v hd, brit, clr - trnsl Qtz, f, occ m, tr c, sbang - sbrndd, sbspher, mod - wl srt, gd calc cmt, lt gry - wh arg (kaol) Mtrx, Mic, Glauc, Tr Pyr, pr vis por.	No Show
CLST: med - dk gry, hd, sbfiss, com f sd, slty, f Glauc, com mucov Mica, sl calc & dol.	
CLST: med - dk gry, hd, sbfiss, com f sd, slty, com mucov Mic, Tr Glauc, Tr microcarb, sl calc & dol.	
SST: lt gry, grn spec, v hd, brit, clr - trnsl Qtz, f – m, sbang - sbrndd, sbspher - spher, mod-wl srt, gd calc cmt, lt gry-wh arg (kaol) Mtrx, muscov Mic, Glauc, Tr Pyr, pr vis por.	No Show
CLST: dk gry, frm - hd, sbfiss-fiss, v f sd, muscov Mic, Tr Glauc, mod calc.	
CLST: dk gry, frm, fiss, Tr muscov Mic, Tr Glauc, sl calc.	
SLST: dk gry, hd, crumb - blky, arg, abun v f sbrnd mod w srt sd, com muscov Mic, Tr Glauc, v sl calc.	
SST: lt gry, grn spec, hd, crumb - brit, clr - trnsl Qtz, f – m, sbang - sbrndd, sbspher - spher, mod-wl srt, wk - mod calc cmt, lt gry-wh arg (kaol) Mtrx, muscov Mic, Glauc, pr - mod vis por.	No Show

*Not depth shifted. Depthshift: +3.25m

STATOIL

CONVENTIONAL CORE DESCRIPTION

Country: Norway | **Area:** Norwegian Sea | **Field:** Tulipan

Well no: 6302/6-1 | **Formation:** Tang Formation

Core no: 2 | **Interval:** 3911 – 3915.7 mMD* | **Cored:** 7 m **Rec:** 4.7 m 67 %

Core size: 4” | **Geologists:** E. Graue, J. Wayne & C. de Lesquen | **Date**: 03.08.2005

Depth (mRKB)	Lithology/Grain size (cly slt vf f m c vc)	Apparent Dip	Shows: STAIN	Shows: FLUOR	Shows: CUT	Porosity: POOR	Porosity: FAIR	Porosity: GOOD	Lithological Description	Remarks (Shows, etc)
3911	C M C M G								**SST:** lt gry, grn spec, hd-v hd, crumb-brit, clr - trnsl Qtz, f-m, sbang - sbrndd, sbspher, wl srt, gd calc cmt, lt gry-wh arg (kaol) Mtrx, Mic, Glauc, pr vis por.	No Show
3911.4	S M G S M G								**SST:** lt gry, grn spec, v hd, brit, clr - trnsl Qtz, f-m, com c, sbang - sbrndd, sbspher, mod-wl srt, gd silic cmt, lt gry-wh arg (kaol) Mtrx, Mic, Glauc, tr calc, pr-mod vis por.	No Show
3912.4	G M C								**CLST:** v dk gry, hd, sbfiss, com f sd, slty, f Glauc, com mucov Mica, occ Microcarb, sl calc.	
3913.4	G M C								**CLST:** med-dk gry, frm, sbfiss, occ f sd, slty, mucov Mic, Glauc, Tr microcarb, sl calc.	
3914.4	G M C								**CLST:** med-dk gry, frm, sbfiss, occ f sd, slty, com mucov Mic, Glauc, Tr microcarb, sl calc.	
3914.9	G M C								**CLST:** lt yel brn, beige, hd, brit, Tr microcarb, non calc.	
3915.7	G M C								**CLST:** med-dk gry, frm, sbfiss, occ f sd, slty, mucov Mic, Glauc, Tr microcarb, v sl calc.	

cly slt vf f m c vc

*Not depth shifted. Depth shifted: +2.9m

STATOIL

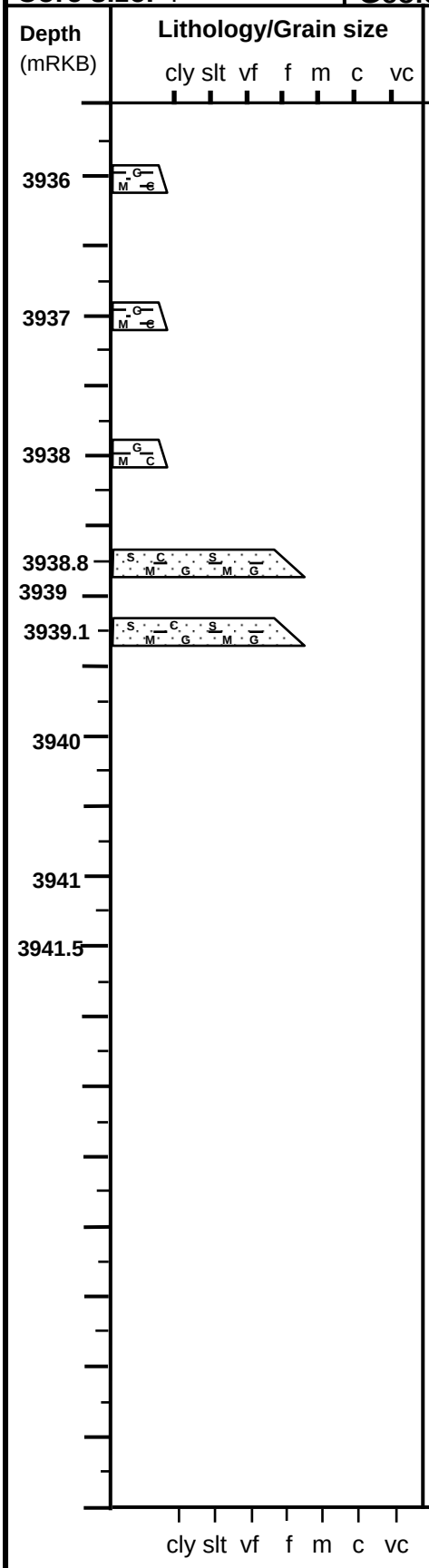
CONVENTIONAL CORE DESCRIPTION

Country: Norway | **Area:** Norwegian Sea | **Field:** Tulipan

Well no: 6302/6-1 | **Formation:** Tang Formation

Core no: 3 | **Interval:** 3936 – 3941.5 mMD* | **Cored:** 5.5 m **Rec:** 3.1 m 56 %

Core size: 4” | **Geologists:** E. Graue, J. Wayne & C. de Lesquen | **Date**: 08.09.2005



Lithological Description

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

CLST: v dk gry, frm- mod hd, blky-sbfiss, slty, com mucov Mica, tr f Glauc occ Microcarb, tr Pyr, non calc.

CLST: v dk gry, frm- mod hd, blky-sbfiss, slty, com mucov Mica, tr f Glauc occ Microcarb, tr Pyr, non calc.

CLST: v dk gry, frm- mod hd, blky-sbfiss, slty, com mucov Mica, tr f Glauc occ Microcarb, tr Pyr, occ SST lenses 2-4mm long, 1-2mm deep, v f-f, glauc, kaol mtx, calc silic cmt.

SST: lt gry, grn spec, hd- v hd, crumb-brit, clr - trnsl Qtz, f-m, ang - sbrnd, sbelong-sbspher, mod srt, mod-gd calc/silic cmt, lt gry-wh arg (kaol) Mtrx, occ mafic rk frags, muscov Mic, Glauc, tr Carb, pr-mod vis por.

SST: lt gry, grn spec, v hd, brit, clr - trnsl Qtz, f-m, ang - sbrnd, sbelong-sbspher, mod srt, v gd calc/silic cmt, lt gry-wh arg (kaol) Mtrx, occ mafic rk frags, muscov Mic, Glauc, tr Carb, no vis por.

Remarks

Shows, etc

No Show

No Show

*Not depth shifted. Depth shifted: +3.5m

FORMATION EVALUATION LOG

FROM : 1285 TO : 4230 SCALE 1/ 500

Well name	: 6302/6-1	Location lat	: 63 31' 38.4"	Rig Name	: EIRIK RAUDE
Client name	: STATOIL	Location long	: 02 45' 51.5"	Rig Type	: Semi-submersible
Field	: TULIPAN	UTM loc [N] (m)	: 7044541	Contractor	: STATOIL
Country	: NORWAY	UTM loc [E] (m)	: 488278		
Area	: Norwegian Sea			Total Depth (m)	: 2530
Block	: 6302/6			TVD (m)	: 2529.9
		Spudded	: 24-06-05	RT - MSL (m)	: 25
		TD reached	: 14-09-05	MSL - Seabed (m)	: 1260.5
		Total drill days	: 84	Depth Reference	: ROTARY TABLE

Clay-shale | Calcareous clay-shal | Marl | Silty clay-shale | Sandy clay-shale | Chert | Silstone

Fine sandstone | Medium sandstone | Coarse sandstone | Calcareous sandstone | Argillaceous sandsto | Limestone | Argillaceous lime

Dolomite | Microcrystallized do | Calcite | Fossils | Smell | Oil and Gas | FIT

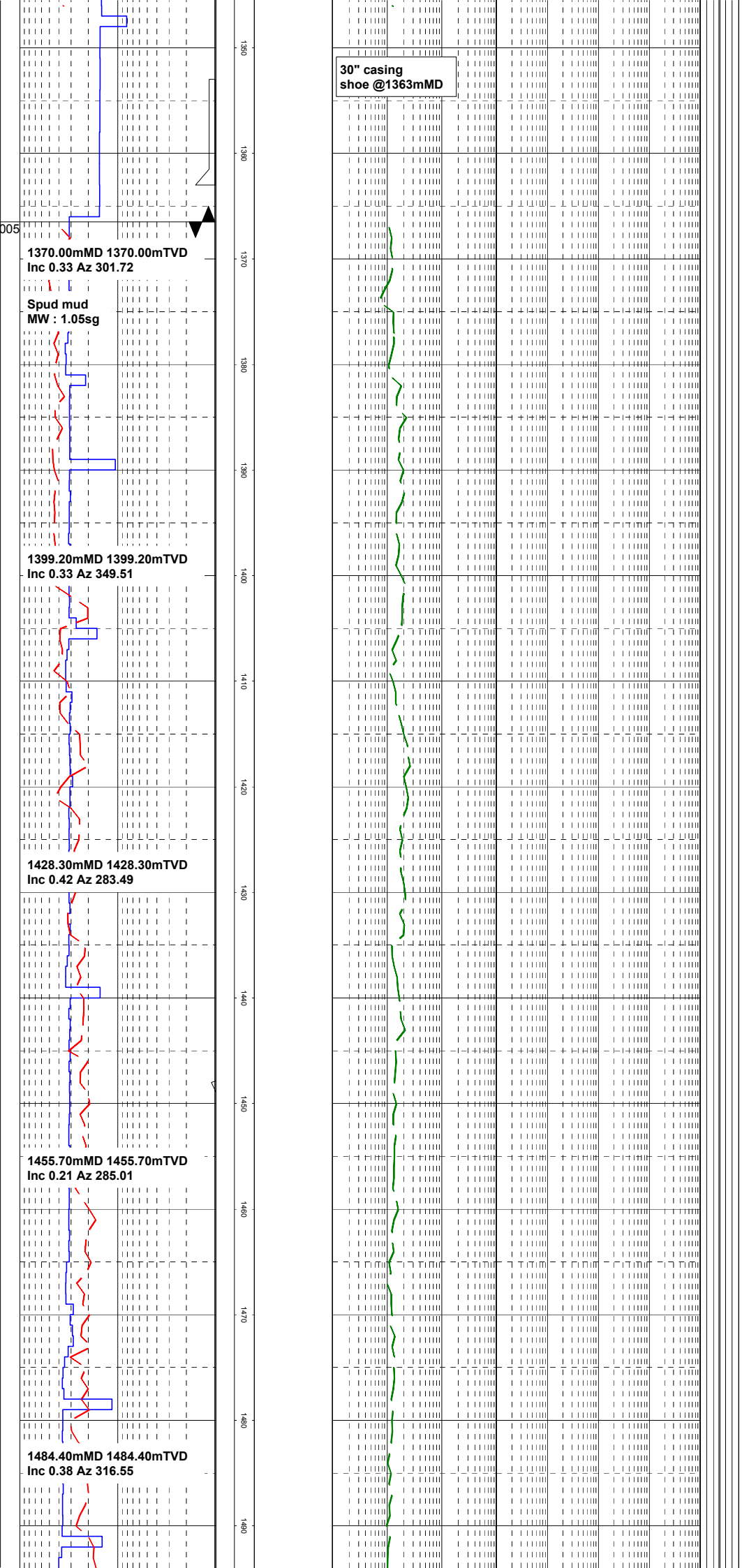
Survey | Mud loss | Mud gain | Sidewall core | Core | Casing Top | Casing shoe

DATE | GAMMA 150 225 300 / 0 75 150 | WOB (tons) | ROP (m/hr) | CORES | DEPTH (mt) | CUTTINGS (%) | RES .2 2 20 200 | TOTAL GAS (%) 100K 550K 1000K | GAS ANALYSIS (ppm) Geoservices RESERVAL FID C1 C2 C3 iC4 nC4 iC5 nC5 0 5K 10K | FLUOR | CUT | LITHOLOGY | GEOLOGICAL DESCRIPTION

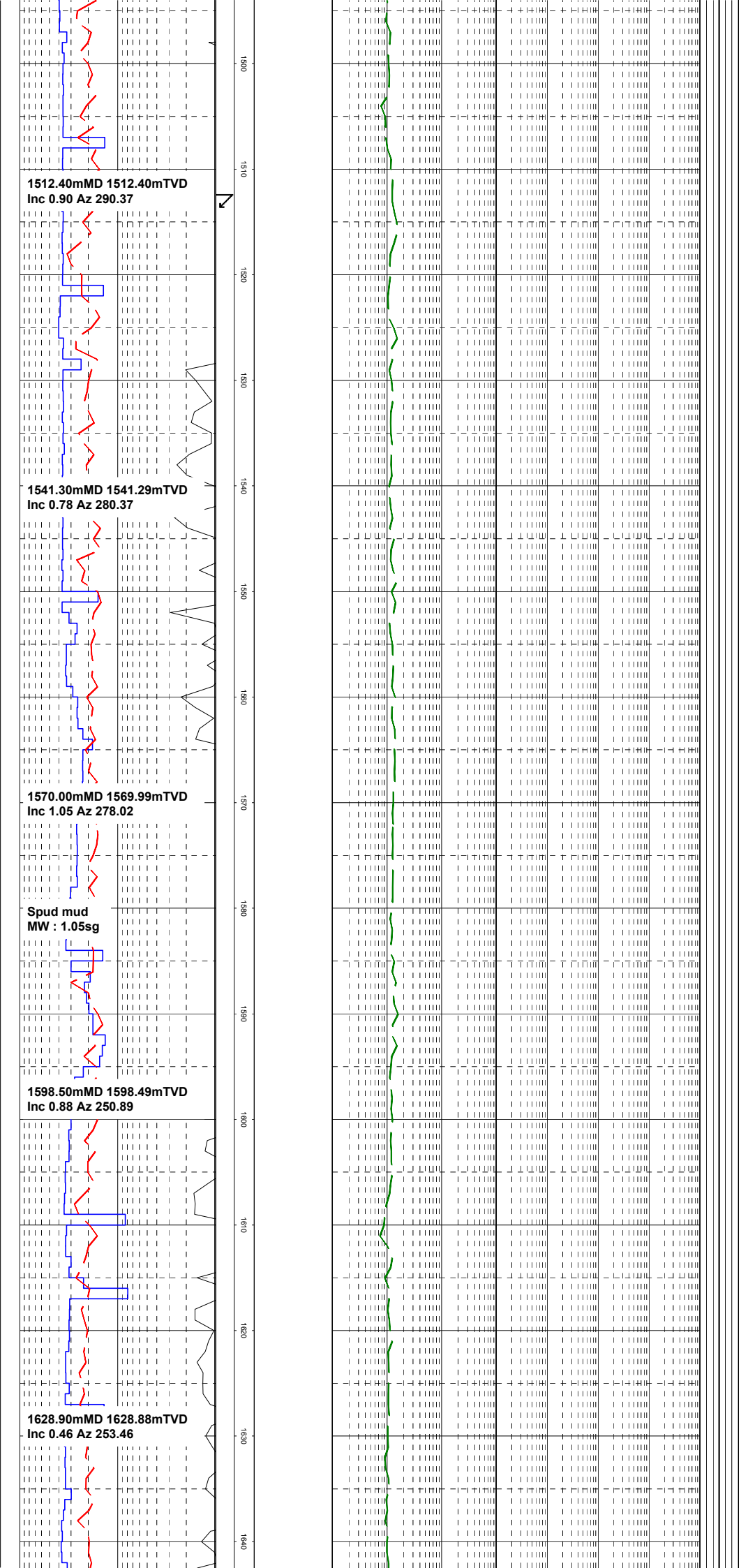
Spudded well Tulipan 6302/6-1
On the 24th of June 2005

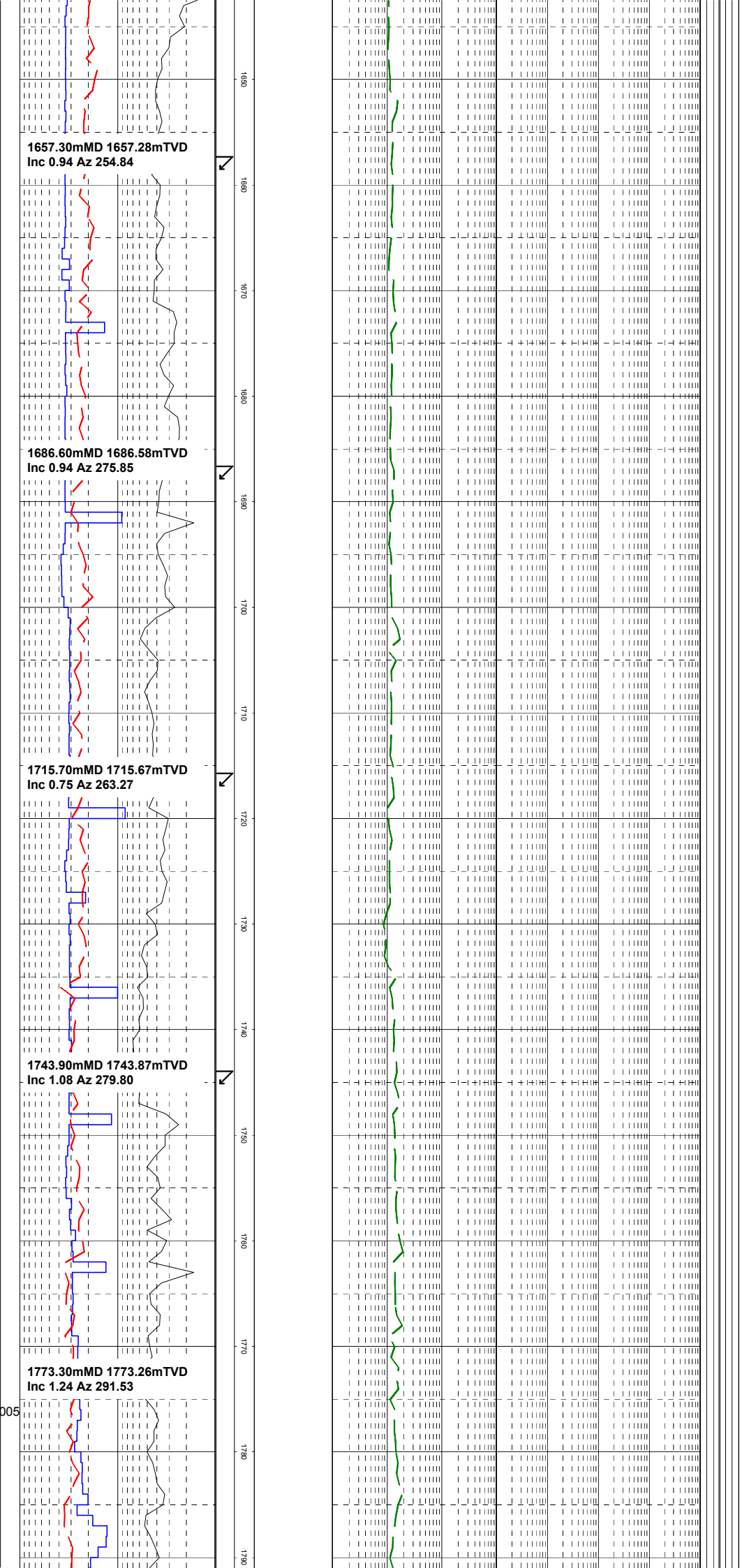
Spud mud
MW : 1.05sg

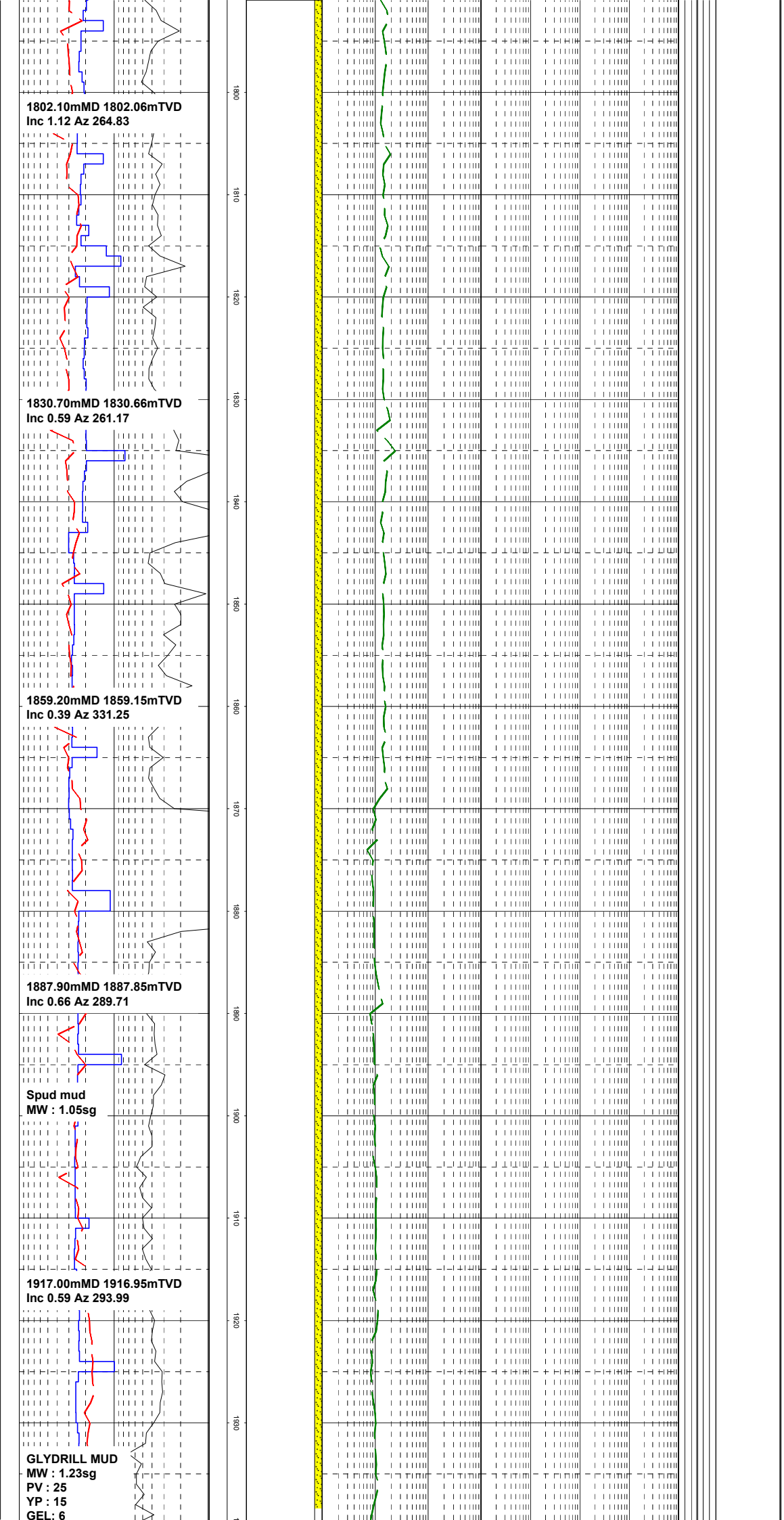
Bit#1 17 1/2" x 26/36" x 42"
Type T11C Reed-Hycalog
Nozzles 1x14, 3x18
In at 1285.5m Out at 1366.5m
No grading

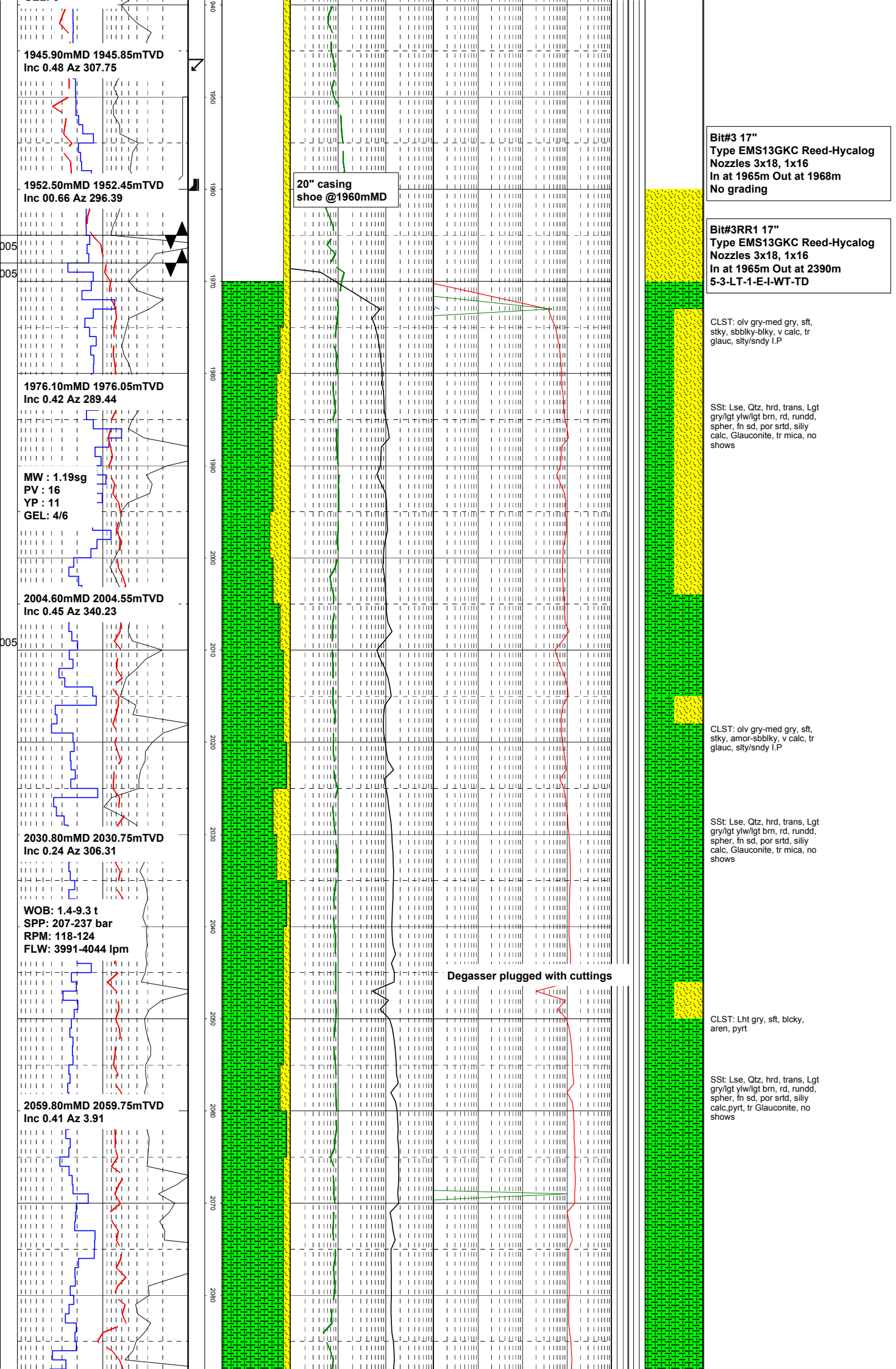


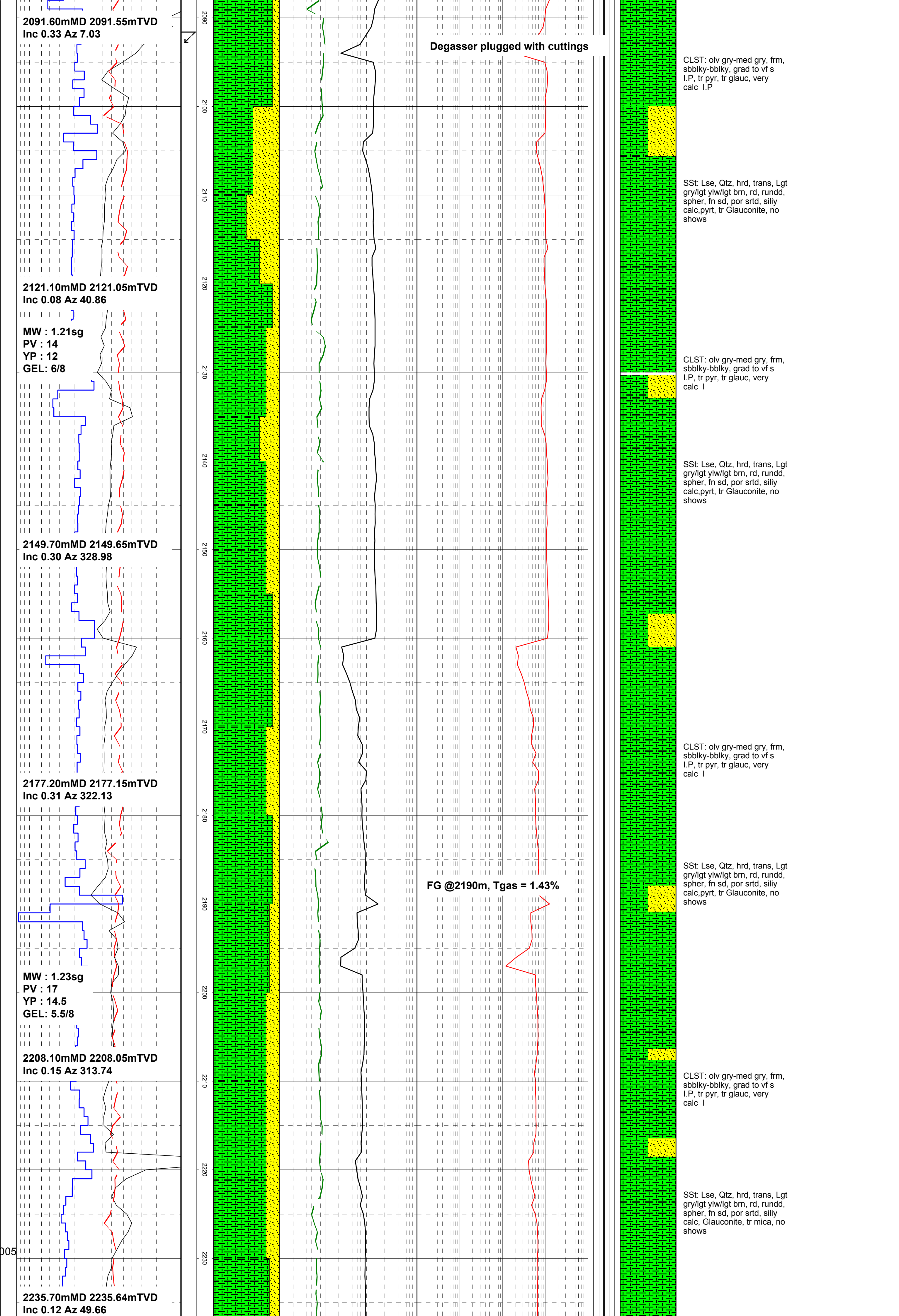
Bit#2RR 26"
Type T11C Reed-Hycalog
Nozzles 1x19, 3x20
In at 1366.5m Out at 1965m
1-1-WT-A-E-I-NO-TD


1512.40mMD 1512.40mTVD
Inc 0.90 Az 290.37
1541.30mMD 1541.29mTVD
Inc 0.78 Az 280.37
1570.00mMD 1569.99mTVD
Inc 1.05 Az 278.02
Spud mud
MW : 1.05sg
1598.50mMD 1598.49mTVD
Inc 0.88 Az 250.89
1628.90mMD 1628.88mTVD
Inc 0.46 Az 253.46
1500
1510
1520
1530
1540
1550
1560
1570
1580
1590
1600
1610
1620
1630
1640

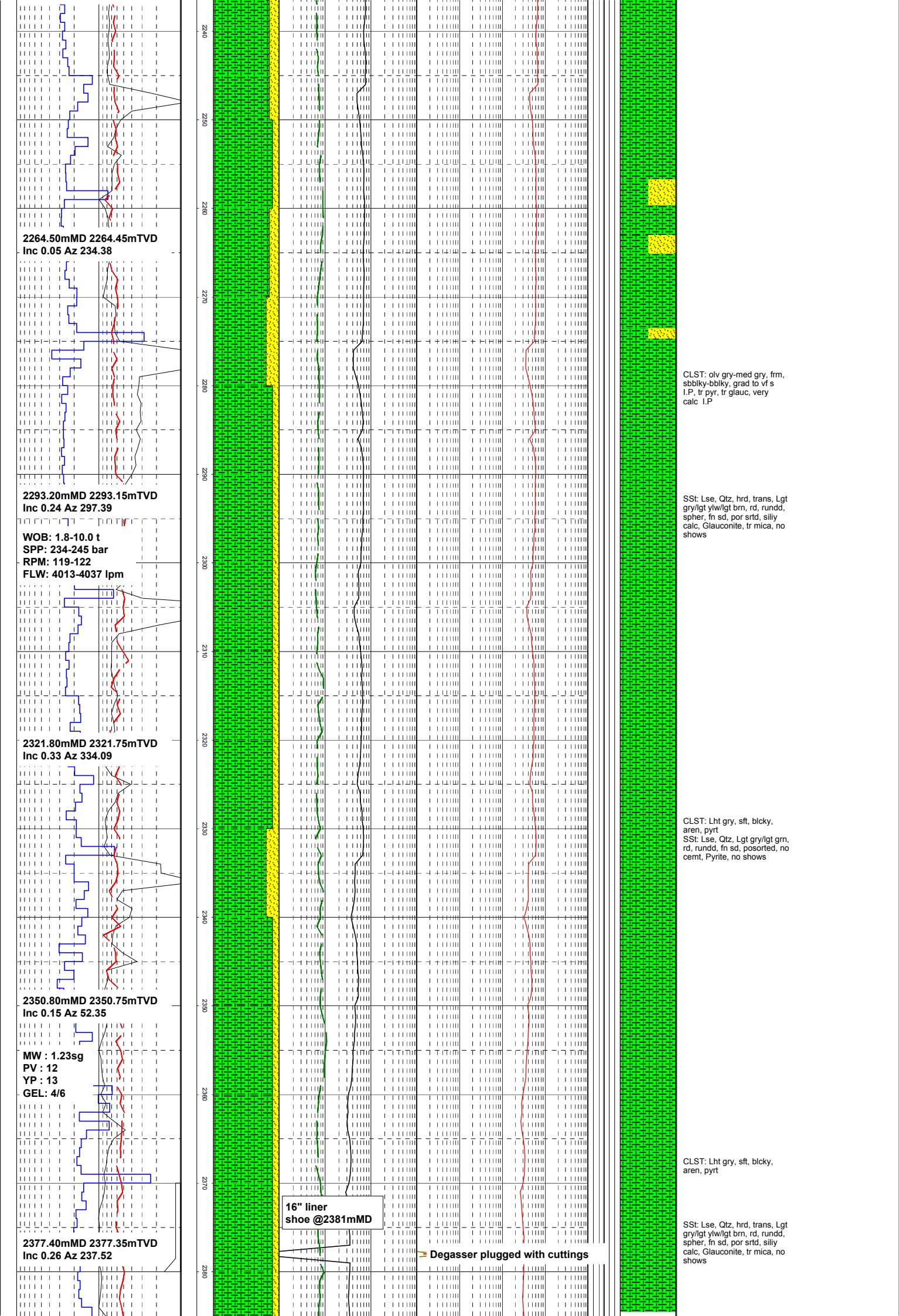

1657.30mMD 1657.28mTVD
Inc 0.94 Az 254.84
1686.60mMD 1686.58mTVD
Inc 0.94 Az 275.85
1715.70mMD 1715.67mTVD
Inc 0.75 Az 263.27
1743.90mMD 1743.87mTVD
Inc 1.08 Az 279.80
1773.30mMD 1773.26mTVD
Inc 1.24 Az 291.53
1650
1660
1670
1680
1690
1700
1710
1720
1730
1740
1750
1760
1770
1780
1790

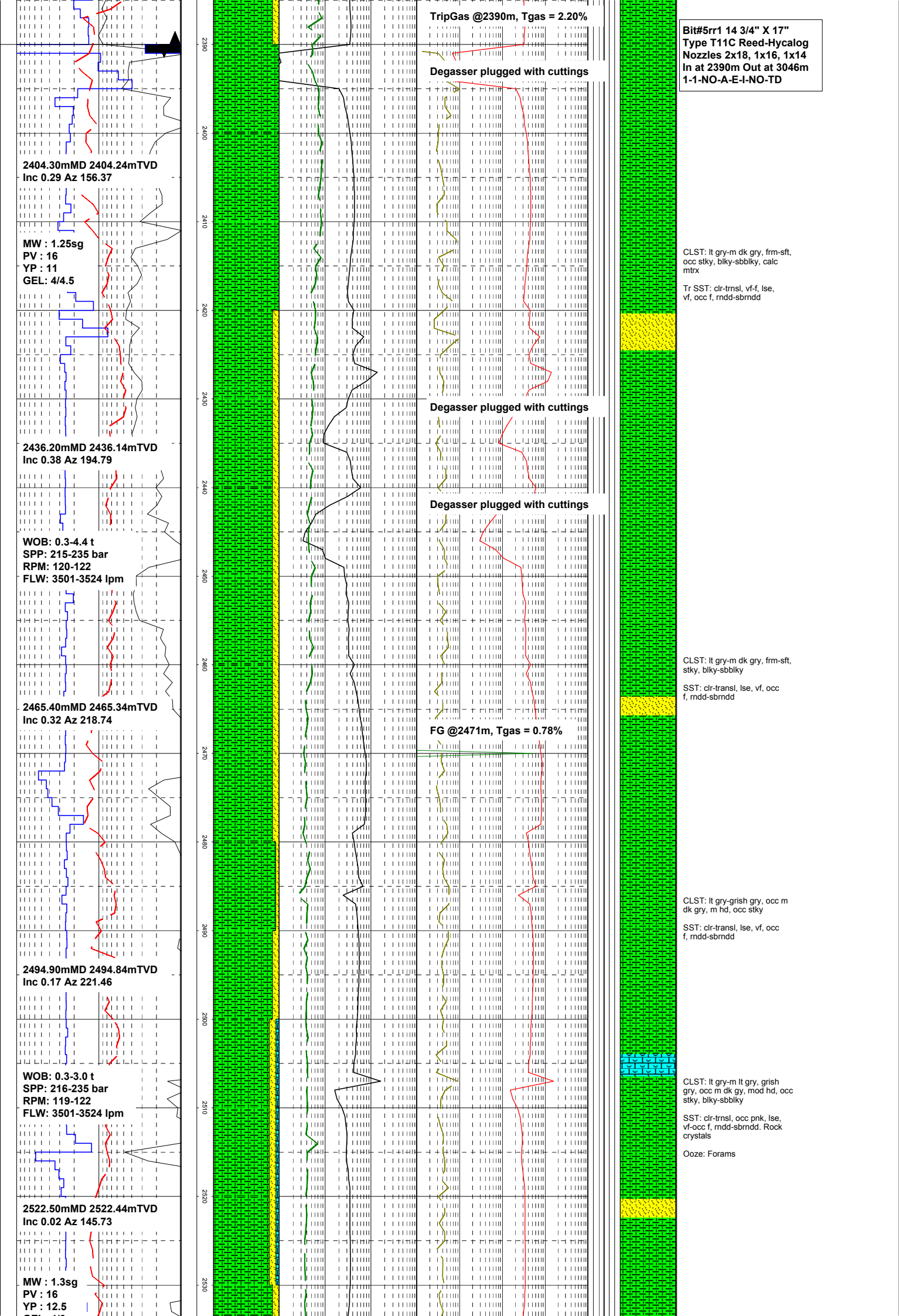

1802.10mMD 1802.06mTVD
Inc 1.12 Az 264.83
1830.70mMD 1830.66mTVD
Inc 0.59 Az 261.17
1859.20mMD 1859.15mTVD
Inc 0.39 Az 331.25
1887.90mMD 1887.85mTVD
Inc 0.66 Az 289.71
Spud mud
MW : 1.05sg
1917.00mMD 1916.95mTVD
Inc 0.59 Az 293.99
GLYDRILL MUD
MW : 1.23sg
PV : 25
YP : 15
GEL: 6
1800
1810
1820
1830
1840
1850
1860
1870
1880
1890
1900
1910
1920
1930

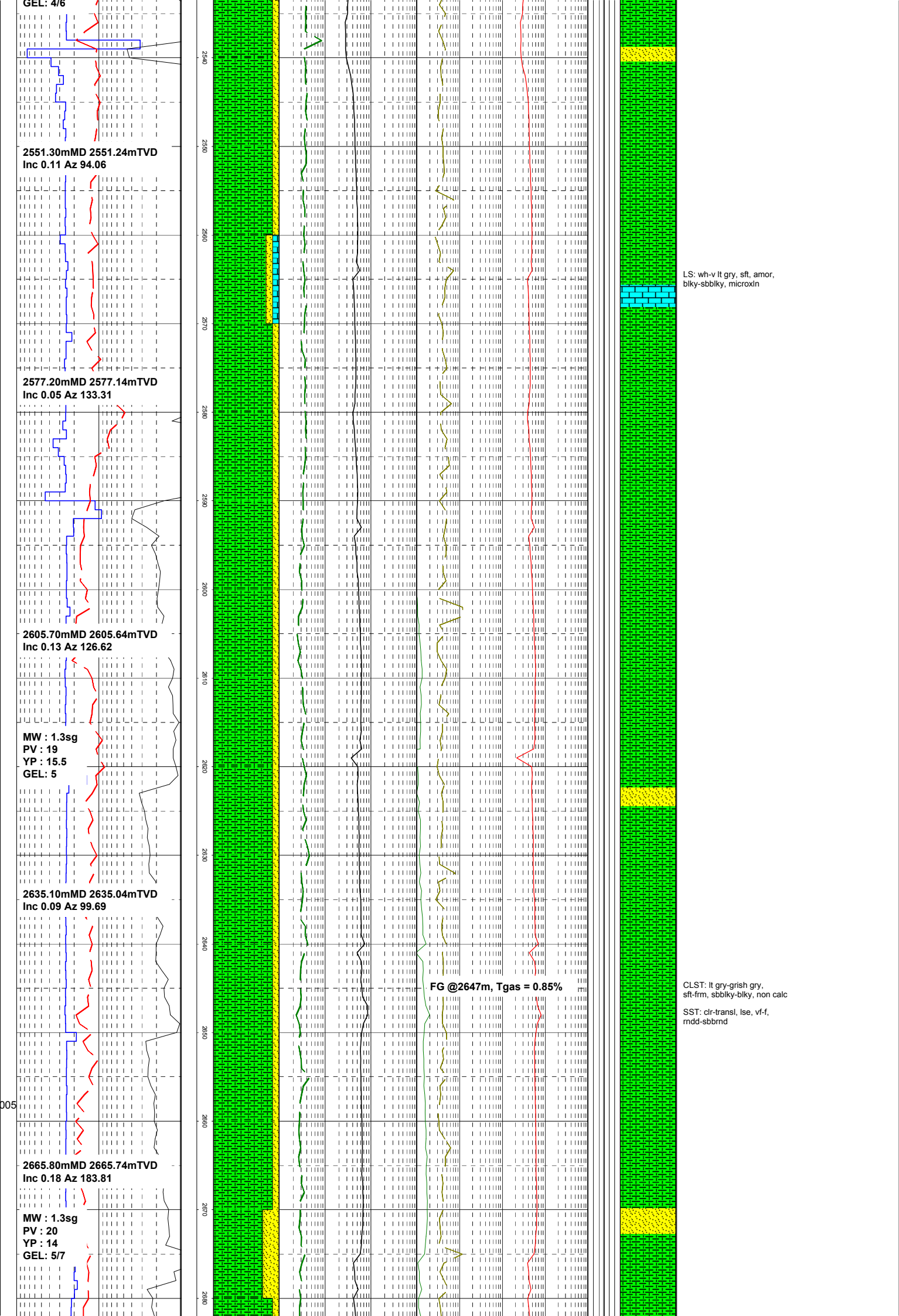

1945.90mMD 1945.85mTVD
Inc 0.48 Az 307.75
1952.50mMD 1952.45mTVD
Inc 00.66 Az 296.39
1976.10mMD 1976.05mTVD
Inc 0.42 Az 289.44
MW : 1.19sg
PV : 16
YP : 11
GEL: 4/6
2004.60mMD 2004.55mTVD
Inc 0.45 Az 340.23
2030.80mMD 2030.75mTVD
Inc 0.24 Az 306.31
WOB: 1.4-9.3 t
SPP: 207-237 bar
RPM: 118-124
FLW: 3991-4044 lpm
2059.80mMD 2059.75mTVD
Inc 0.41 Az 3.91
20" casing
shoe @1960mMD
Degasser plugged with cuttings
Bit#3 17"
Type EMS13GKC Reed-Hycalog
Nozzles 3x18, 1x16
In at 1965m Out at 1968m
No grading
Bit#3RR1 17"
Type EMS13GKC Reed-Hycalog
Nozzles 3x18, 1x16
In at 1965m Out at 2390m
5-3-LT-1-E-I-WT-TD
CLST: olv gry-med gry, sft, stky, sbblky-blky, v calc, tr glauc, slty/sndy l.P
SSt: Lse, Qtz, hrd, trans, Lgt gry/lgt ylw/lgt brn, rd, rundd, spher, fn sd, por srtd, siliy calc, Glauconite, tr mica, no shows
CLST: olv gry-med gry, sft, stky, amor-sbblky, v calc, tr glauc, slty/sndy l.P
SSt: Lse, Qtz, hrd, trans, Lgt gry/lgt ylw/lgt brn, rd, rundd, spher, fn sd, por srtd, siliy calc, Glauconite, tr mica, no shows
CLST: Lht gry, sft, blcky, aren, pyrt
SSt: Lse, Qtz, hrd, trans, Lgt gry/lgt ylw/lgt brn, rd, rundd, spher, fn sd, por srtd, siliy calc,pyrt, tr Glauconite, no shows

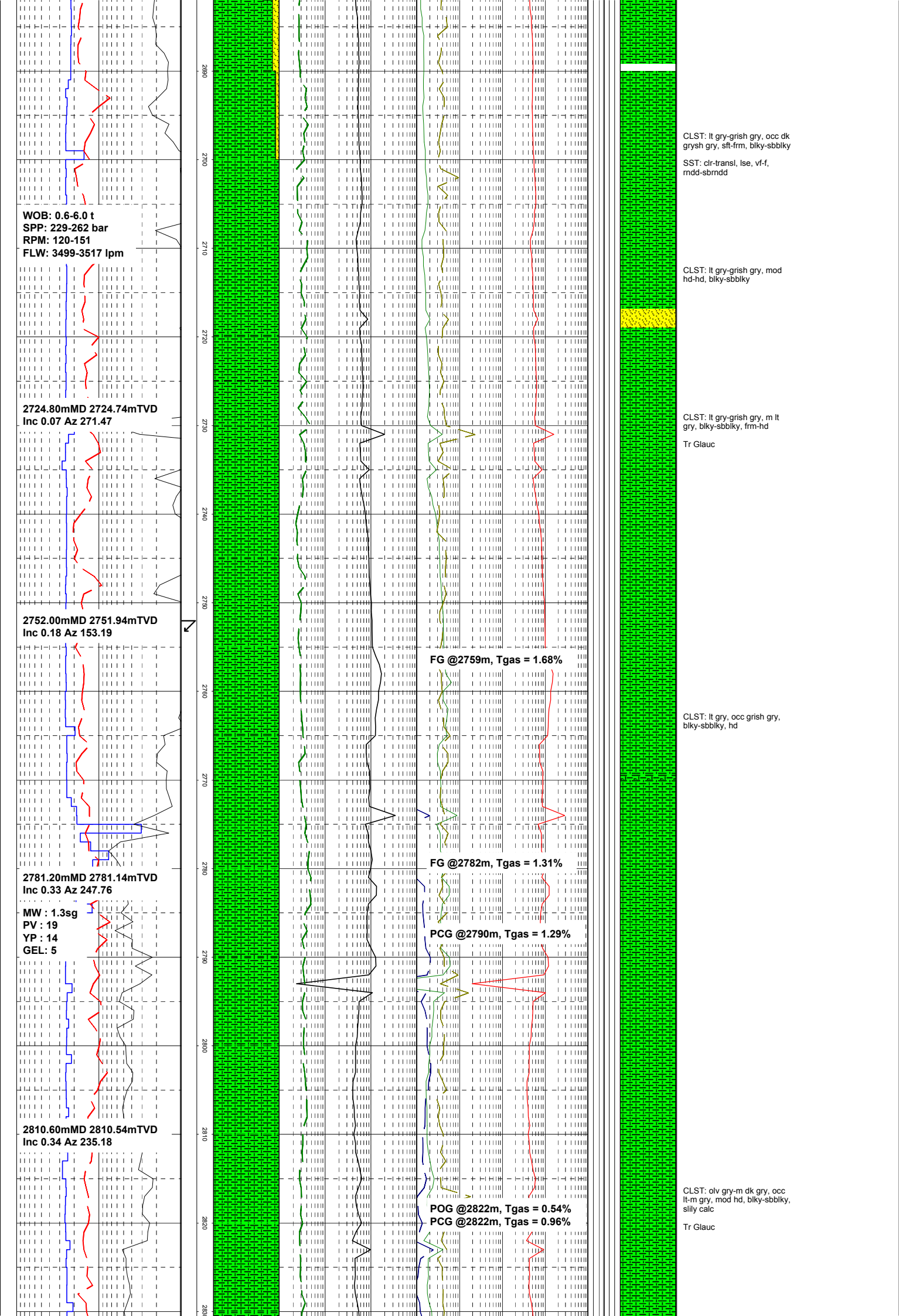


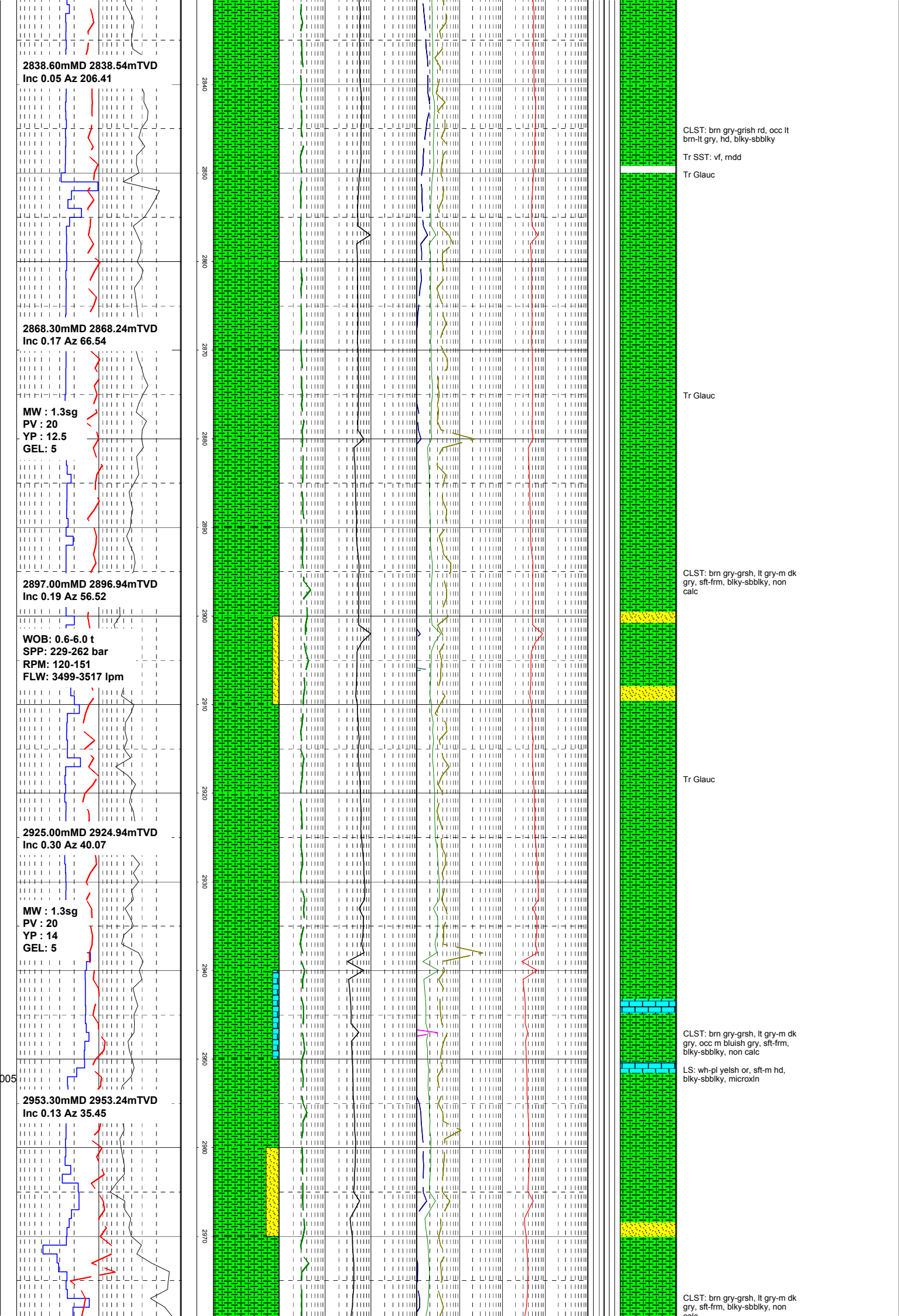
2091.60mMD 2091.55mTVD
Inc 0.33 Az 7.03
2121.10mMD 2121.05mTVD
Inc 0.08 Az 40.86
MW : 1.21sg
PV : 14
YP : 12
GEL: 6/8
2149.70mMD 2149.65mTVD
Inc 0.30 Az 328.98
2177.20mMD 2177.15mTVD
Inc 0.31 Az 322.13
MW : 1.23sg
PV : 17
YP : 14.5
GEL: 5.5/8
2208.10mMD 2208.05mTVD
Inc 0.15 Az 313.74
2235.70mMD 2235.64mTVD
Inc 0.12 Az 49.66
005
2090
2100
2110
2120
2130
2140
2150
2160
2170
2180
2190
2200
2210
2220
2230
Degasser plugged with cuttings
FG @2190m, Tgas = 1.43%
CLST: olv gry-med gry, frm, sbblky-bblky, grad to vf s I.P, tr pyr, tr glauc, very calc I.P
SSt: Lse, Qtz, hrd, trans, Lgt gry/lgt ylw/lgt brn, rd, rundd, spher, fn sd, por srtd, siliy calc,pyrt, tr Glauconite, no shows
CLST: olv gry-med gry, frm, sbblky-bblky, grad to vf s I.P, tr pyr, tr glauc, very calc I
SSt: Lse, Qtz, hrd, trans, Lgt gry/lgt ylw/lgt brn, rd, rundd, spher, fn sd, por srtd, siliy calc,pyrt, tr Glauconite, no shows
CLST: olv gry-med gry, frm, sbblky-bblky, grad to vf s I.P, tr pyr, tr glauc, very calc I
SSt: Lse, Qtz, hrd, trans, Lgt gry/lgt ylw/lgt brn, rd, rundd, spher, fn sd, por srtd, siliy calc,pyrt, tr Glauconite, no shows
CLST: olv gry-med gry, frm, sbblky-bblky, grad to vf s I.P, tr pyr, tr glauc, very calc I
SSt: Lse, Qtz, hrd, trans, Lgt gry/lgt ylw/lgt brn, rd, rundd, spher, fn sd, por srtd, siliy calc, Glauconite, tr mica, no shows

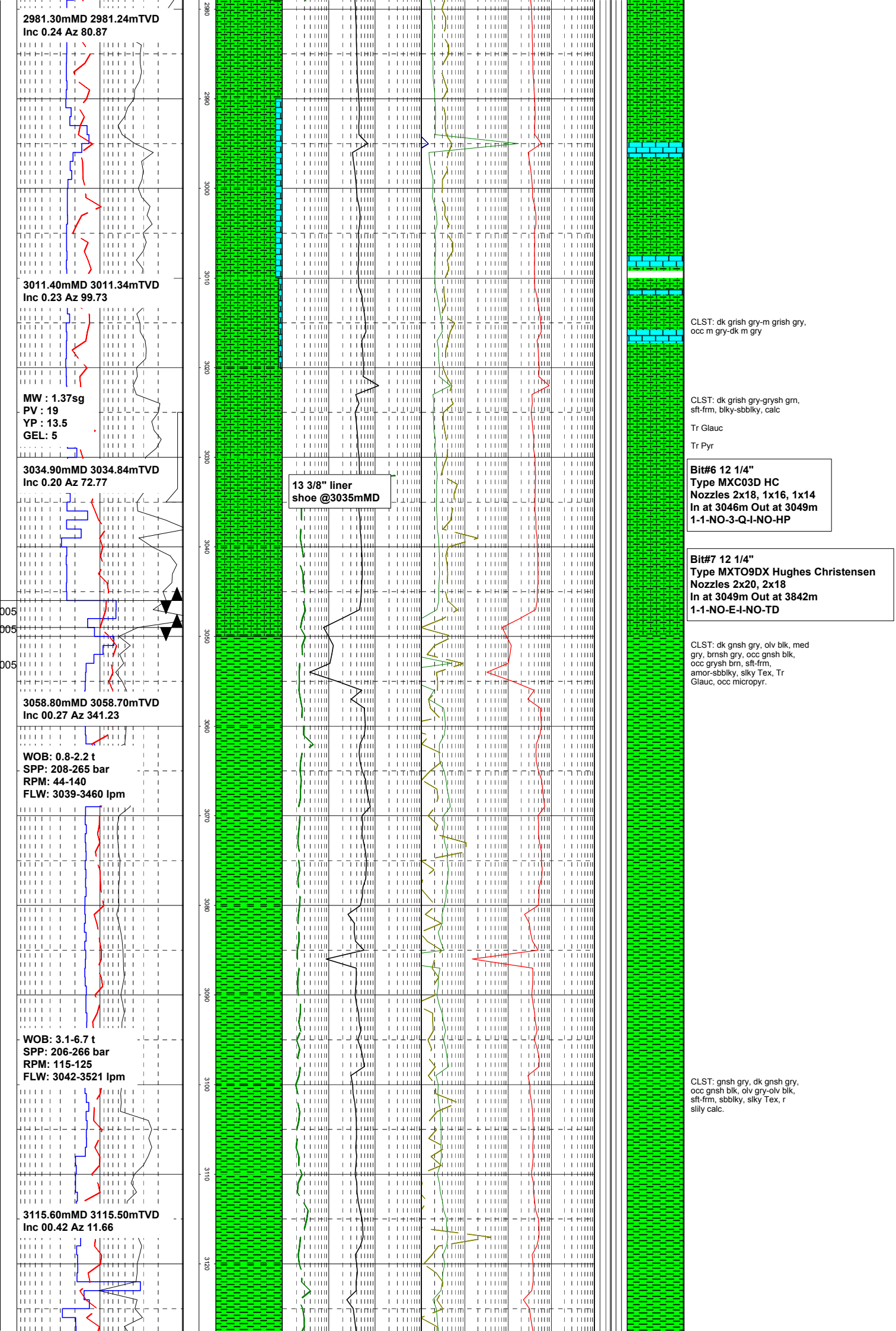

2264.50mMD 2264.45mTVD
Inc 0.05 Az 234.38
2293.20mMD 2293.15mTVD
Inc 0.24 Az 297.39
WOB: 1.8-10.0 t
SPP: 234-245 bar
RPM: 119-122
FLW: 4013-4037 lpm
2321.80mMD 2321.75mTVD
Inc 0.33 Az 334.09
2350.80mMD 2350.75mTVD
Inc 0.15 Az 52.35
MW : 1.23sg
PV : 12
YP : 13
GEL: 4/6
2377.40mMD 2377.35mTVD
Inc 0.26 Az 237.52
240
250
260
270
280
290
300
310
320
330
340
350
360
370
380
16" liner
shoe @2381mMD
Degasser plugged with cuttings
CLST: olv gry-med gry, frm, sbblky-bblky, grad to vf s l.P, tr pyr, tr glauc, very calc l.P
SSt: Lse, Qtz, hrd, trans, Lgt gry/lgt ylw/lgt brn, rd, rundd, spher, fn sd, por srtd, siliy calc, Glauconite, tr mica, no shows
CLST: Lht gry, sft, blcky, aren, pyrt
SSt: Lse, Qtz, Lgt gry/lgt grn, rd, rundd, fn sd, posorted, no cemt, Pyrite, no shows
CLST: Lht gry, sft, blcky, aren, pyrt
SSt: Lse, Qtz, hrd, trans, Lgt gry/lgt ylw/lgt brn, rd, rundd, spher, fn sd, por srtd, siliy calc, Glauconite, tr mica, no shows

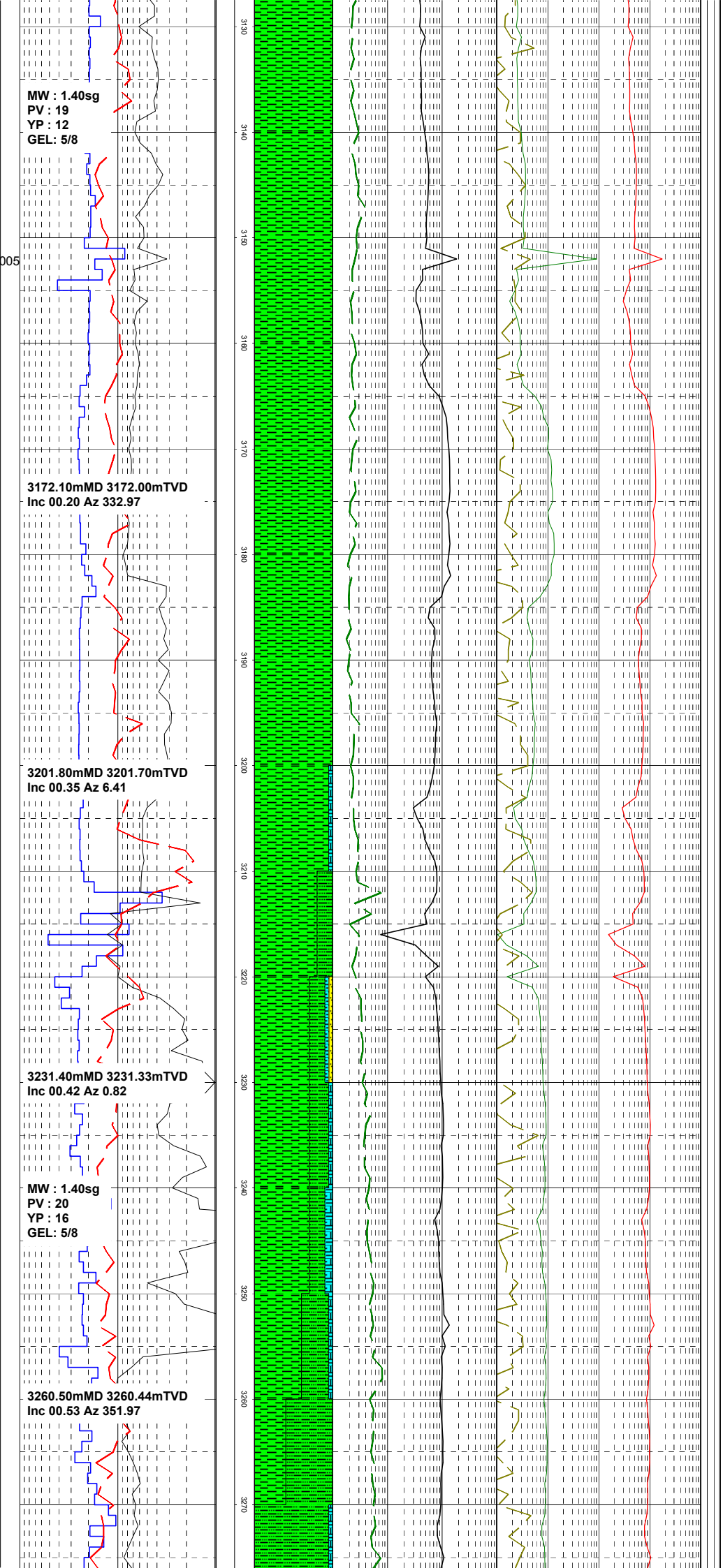

TripGas @2390m, Tgas = 2.20%
Degasser plugged with cuttings
Degasser plugged with cuttings
Degasser plugged with cuttings
FG @2471m, Tgas = 0.78%
2390
2400
2410
2420
2430
2440
2450
2460
2470
2480
2490
2500
2510
2520
2530
2404.30mMD 2404.24mTVD
Inc 0.29 Az 156.37
MW : 1.25sg
PV : 16
YP : 11
GEL: 4/4.5
2436.20mMD 2436.14mTVD
Inc 0.38 Az 194.79
WOB: 0.3-4.4 t
SPP: 215-235 bar
RPM: 120-122
FLW: 3501-3524 lpm
2465.40mMD 2465.34mTVD
Inc 0.32 Az 218.74
2494.90mMD 2494.84mTVD
Inc 0.17 Az 221.46
WOB: 0.3-3.0 t
SPP: 216-235 bar
RPM: 119-122
FLW: 3501-3524 lpm
2522.50mMD 2522.44mTVD
Inc 0.02 Az 145.73
MW : 1.3sg
PV : 16
YP : 12.5
Bit#5rr1 14 3/4" X 17"
Type T11C Reed-Hycalog
Nozzles 2x18, 1x16, 1x14
In at 2390m Out at 3046m
1-1-NO-A-E-I-NO-TD
CLST: lt gry-m dk gry, frm-sft, occ stky, blky-sbblky, calc mtrx
Tr SST: clr-trnsl, vf-f, lse, vf, occ f, rndd-sbrndd
CLST: lt gry-m dk gry, frm-sft, stky, blky-sbblky
SST: clr-transl, lse, vf, occ f, rndd-sbrndd
CLST: lt gry-grish gry, occ m dk gry, m hd, occ stky
SST: clr-transl, lse, vf, occ f, rndd-sbrndd
CLST: lt gry-m lt gry, grish gry, occ m dk gy, mod hd, occ stky, blky-sbblky
SST: clr-trnsl, occ pnk, lse, vf-occ f, rndd-sbrndd. Rock crystals
Ooze: Forams


GEL: 4/6
2551.30mMD 2551.24mTVD
Inc 0.11 Az 94.06
2577.20mMD 2577.14mTVD
Inc 0.05 Az 133.31
2605.70mMD 2605.64mTVD
Inc 0.13 Az 126.62
MW : 1.3sg
PV : 19
YP : 15.5
GEL: 5
2635.10mMD 2635.04mTVD
Inc 0.09 Az 99.69
2665.80mMD 2665.74mTVD
Inc 0.18 Az 183.81
MW : 1.3sg
PV : 20
YP : 14
GEL: 5/7
2540
2550
2560
2570
2580
2590
2600
2610
2620
2630
2640
2650
2660
2670
2680
FG @2647m, Tgas = 0.85%
LS: wh-v lt gry, sft, amor, blky-sbblky, microxln
CLST: lt gry-grish gry, sft-frm, sbblky-blky, non calc
SST: clr-transl, lse, vf-f, rndd-sbbrnd


WOB: 0.6-6.0 t
SPP: 229-262 bar
RPM: 120-151
FLW: 3499-3517 lpm
2724.80mMD 2724.74mTVD
Inc 0.07 Az 271.47
2752.00mMD 2751.94mTVD
Inc 0.18 Az 153.19
2781.20mMD 2781.14mTVD
Inc 0.33 Az 247.76
MW : 1.3sg
PV : 19
YP : 14
GEL: 5
2810.60mMD 2810.54mTVD
Inc 0.34 Az 235.18
2690
2700
2710
2720
2730
2740
2750
2760
2770
2780
2790
2800
2810
2820
FG @2759m, Tgas = 1.68%
FG @2782m, Tgas = 1.31%
PCG @2790m, Tgas = 1.29%
POG @2822m, Tgas = 0.54%
PCG @2822m, Tgas = 0.96%
CLST: lt gry-grish gry, occ dk grysh gry, sft-frm, blky-sbblky
SST: clr-transl, lse, vf-f, rndd-sbrndd
CLST: lt gry-grish gry, mod hd-hd, blky-sbblky
CLST: lt gry-grish gry, m lt gry, blky-sbblky, frm-hd
Tr Glauc
CLST: lt gry, occ grish gry, blky-sbblky, hd
CLST: olv gry-m dk gry, occ lt-m gry, mod hd, blky-sbblky, slily calc
Tr Glauc


2838.60mMD 2838.54mTVD
Inc 0.05 Az 206.41
2868.30mMD 2868.24mTVD
Inc 0.17 Az 66.54
MW : 1.3sg
PV : 20
YP : 12.5
GEL: 5
2897.00mMD 2896.94mTVD
Inc 0.19 Az 56.52
WOB: 0.6-6.0 t
SPP: 229-262 bar
RPM: 120-151
FLW: 3499-3517 lpm
2925.00mMD 2924.94mTVD
Inc 0.30 Az 40.07
MW : 1.3sg
PV : 20
YP : 14
GEL: 5
2953.30mMD 2953.24mTVD
Inc 0.13 Az 35.45
2840
2850
2860
2870
2880
2890
2900
2910
2920
2930
2940
2950
2960
2970
CLST: brn gry-grish rd, occ lt brn-lt gry, hd, blky-sbblky
Tr SST: vf, rndd
Tr Glauc
Tr Glauc
CLST: brn gry-grsh, lt gry-m dk gry, sft-frm, blky-sbblky, non calc
Tr Glauc
CLST: brn gry-grsh, lt gry-m dk gry, occ m bluish gry, sft-frm, blky-sbblky, non calc
LS: wh-pl yelsh or, sft-m hd, blky-sbblky, microxln
CLST: brn gry-grsh, lt gry-m dk gry, sft-frm, blky-sbblky, non


2981.30mMD 2981.24mTVD
Inc 0.24 Az 80.87
3011.40mMD 3011.34mTVD
Inc 0.23 Az 99.73
MW : 1.37sg
PV : 19
YP : 13.5
GEL: 5
3034.90mMD 3034.84mTVD
Inc 0.20 Az 72.77
13 3/8" liner
shoe @3035mMD
3058.80mMD 3058.70mTVD
Inc 00.27 Az 341.23
WOB: 0.8-2.2 t
SPP: 208-265 bar
RPM: 44-140
FLW: 3039-3460 lpm
WOB: 3.1-6.7 t
SPP: 206-266 bar
RPM: 115-125
FLW: 3042-3521 lpm
3115.60mMD 3115.50mTVD
Inc 00.42 Az 11.66
2980
2990
3000
3010
3020
3030
3040
3050
3060
3070
3080
3090
3100
3110
3120
CLST: dk grish gry-m grish gry, occ m gry-dk m gry
CLST: dk grish gry-grysh grn, sft-frm, blky-sbblky, calc
Tr Glauc
Tr Pyr
Bit#6 12 1/4"
Type MXC03D HC
Nozzles 2x18, 1x16, 1x14
In at 3046m Out at 3049m
1-1-NO-3-Q-I-NO-HP
Bit#7 12 1/4"
Type MXTO9DX Hughes Christensen
Nozzles 2x20, 2x18
In at 3049m Out at 3842m
1-1-NO-E-I-NO-TD
CLST: dk gnsh gry, olv blk, med gry, brnsh gry, occ gnsh blk, occ grysh brn, sft-frm, amor-sbblky, slky Tex, Tr Glauc, occ micropyr.
CLST: gnsh gry, dk gnsh gry, occ gnsh blk, olv gry-olv blk, sft-frm, sbblky, slky Tex, r slily calc.



CLST: gnsh gry, dk gnsh gry, olv gry-olv blk, occ brnsh blk, sft-frm, slily sticky i.p., crumbly i.p., amor-sbblky, slky Tex, Kao.

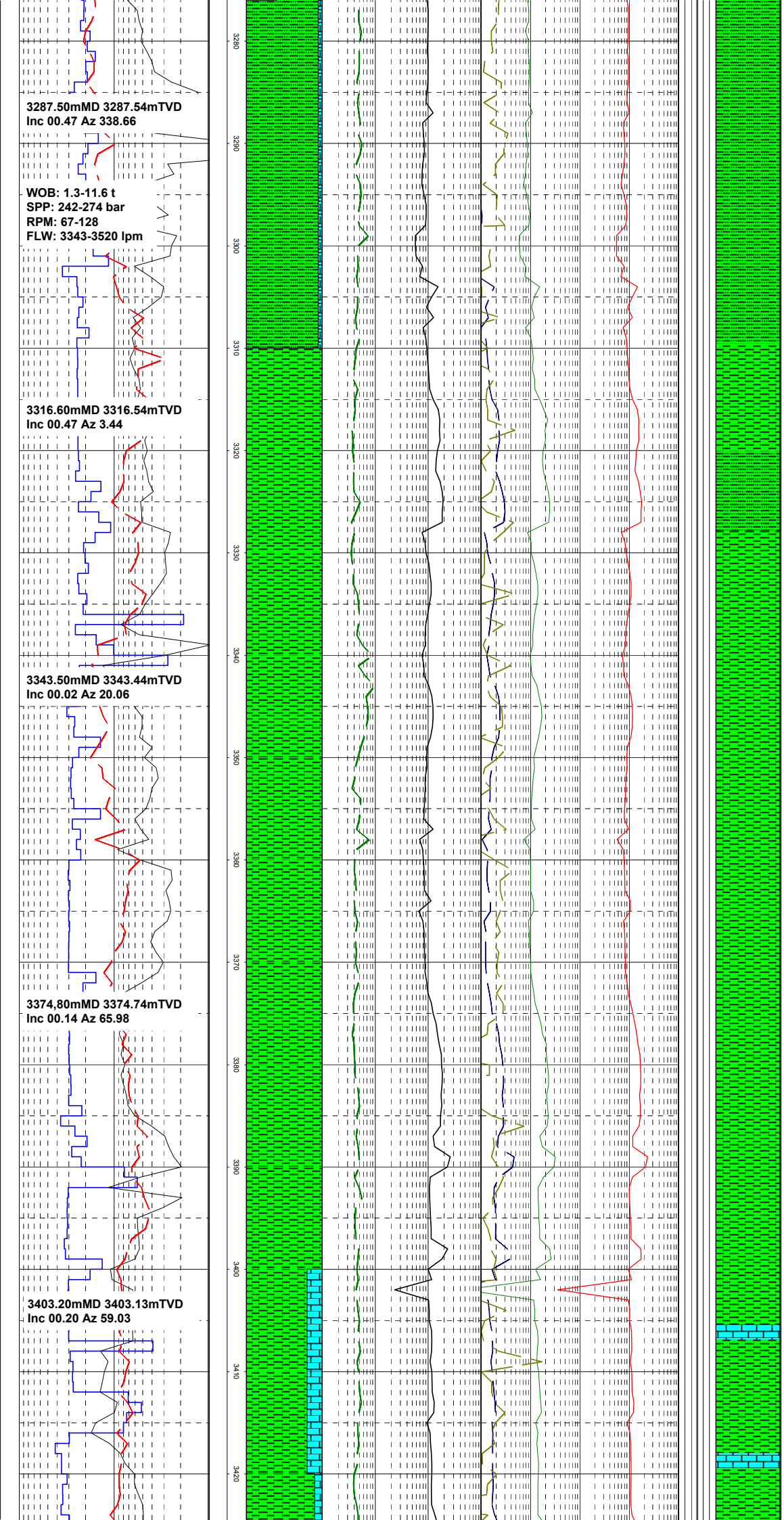
CLST: gnsh gry, dk gnsh gry, grysh brn, med dk gry, occ gnsh blk, sft-frm, sbblky, slky-ea Tex, Tr carb Spks, Kao.

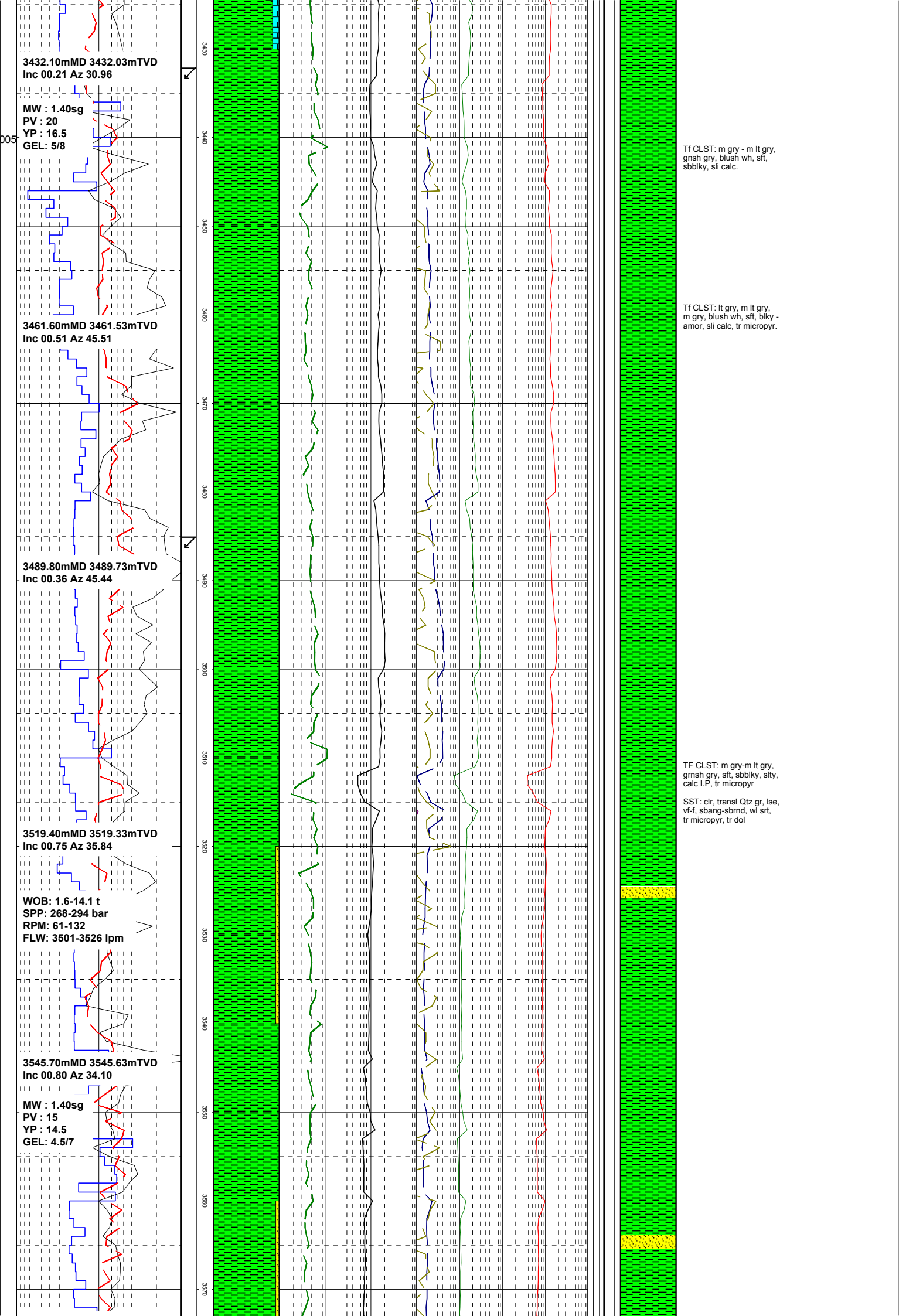
LS: lt gnsh gry, sft-frm, crumbly, amor, microxln, arg, carb.

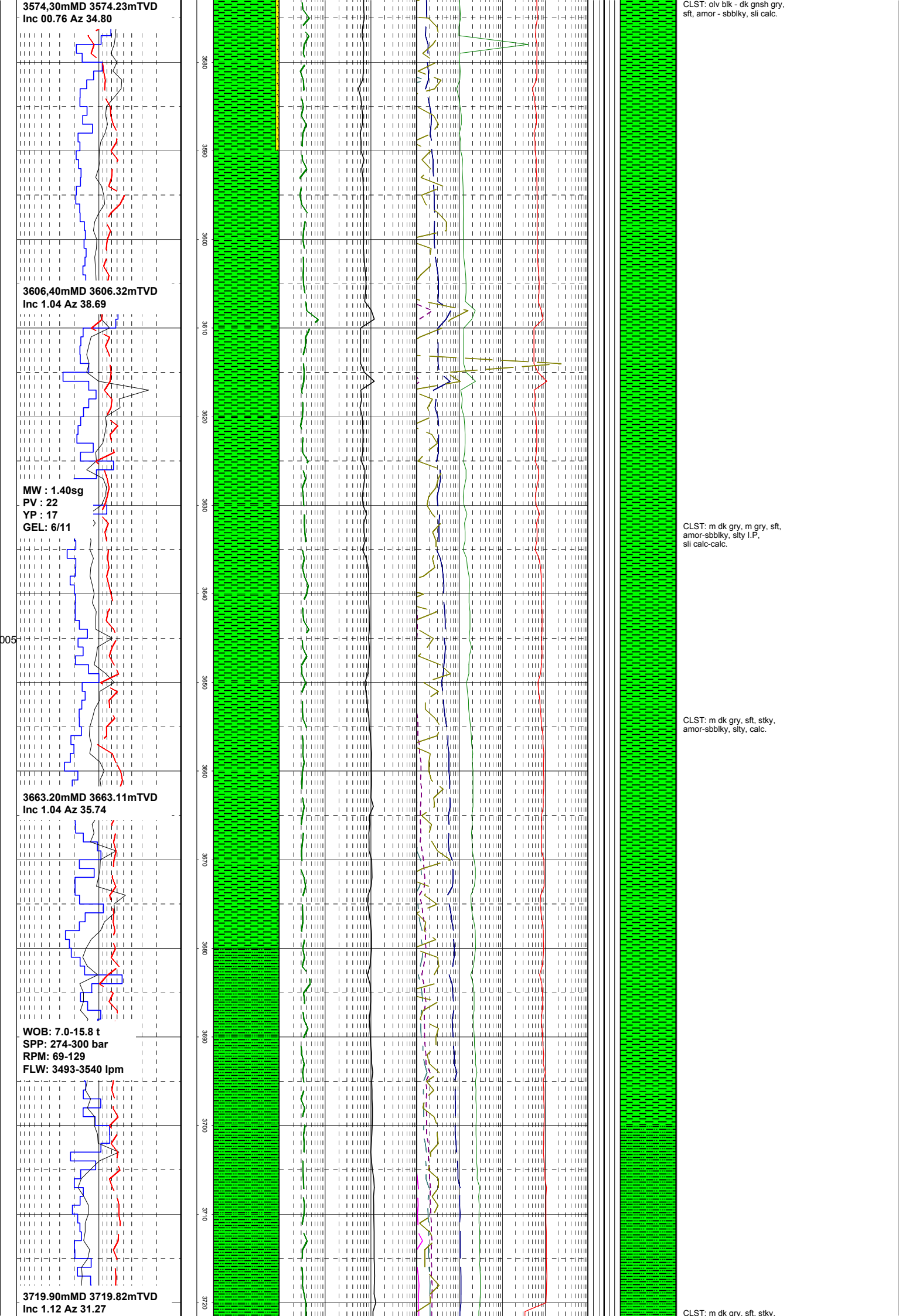
SST: clr-trnsl, mky wh, lse Qtz gr, v f, sbrndd-sbang, mod srt.

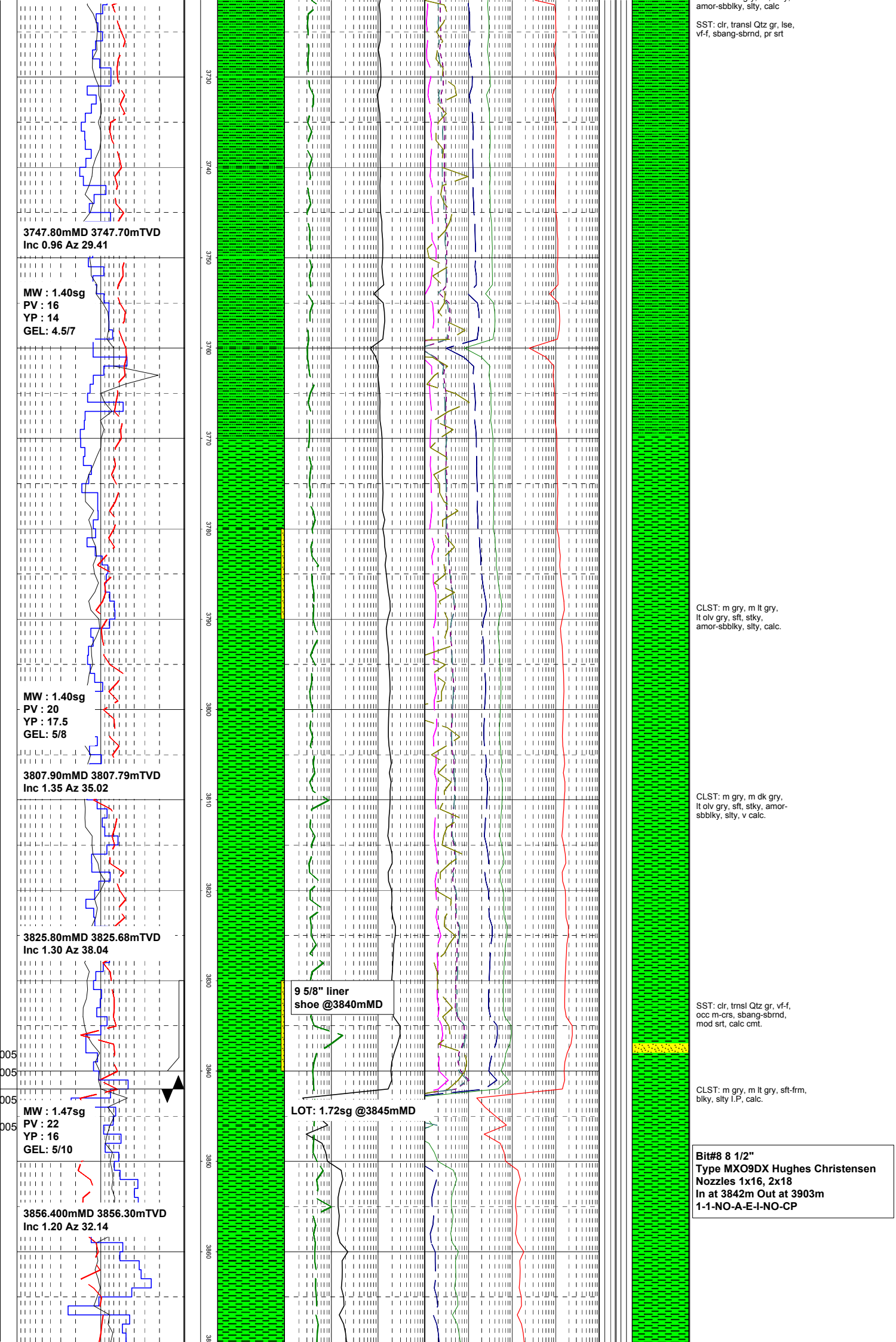
LS: wh-lt yelsh gry, sft, lse i.p., suc, amor-sbblky, microxln, arg, carb, Glauc.

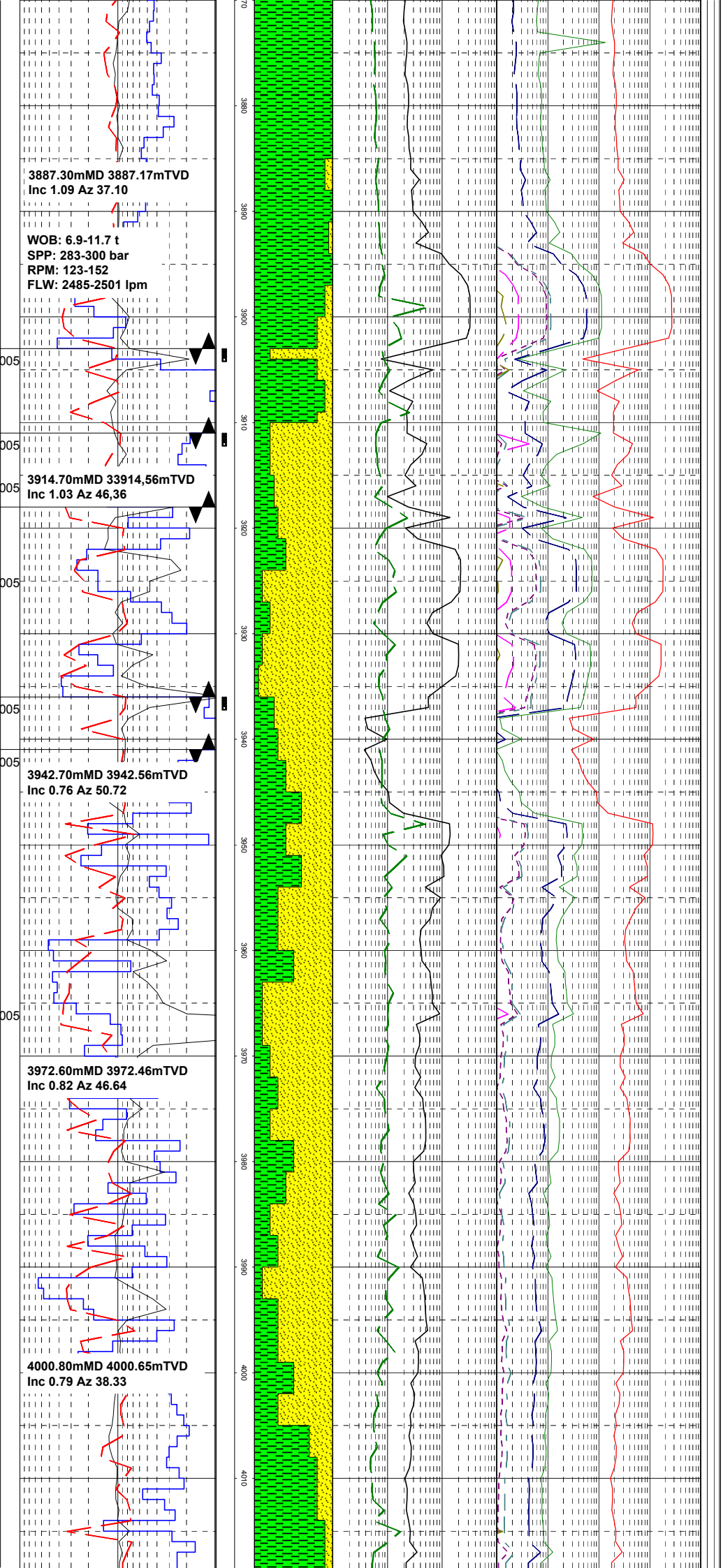
CLST: gnsh gry, dk gnsh gry, grysh brn, med dk gry, occ gnsh blk, brnsh blk-olv blk, sft-frm, sticky i.p., amor-sbblky, ea-slky Tex, slty i.p., calc, carb Spks, Glauc, Kao.


3287.50mMD 3287.54mTVD
Inc 00.47 Az 338.66
WOB: 1.3-11.6 t
SPP: 242-274 bar
RPM: 67-128
FLW: 3343-3520 lpm
3316.60mMD 3316.54mTVD
Inc 00.47 Az 3.44
3343.50mMD 3343.44mTVD
Inc 00.02 Az 20.06
3374,80mMD 3374.74mTVD
Inc 00.14 Az 65.98
3403.20mMD 3403.13mTVD
Inc 00.20 Az 59.03
3280
3290
3300
3310
3320
3330
3340
3350
3360
3370
3380
3390
3400
3410
3420
CLST: pred olv blk, occ med lt, grysh brn, sft-frm, crumbly, amor, slty, calc
LS: wh-lt yelsh gry, sft-frm, crumbly, amor, microxln, arg, carb
CLST: m gry, gnsh gry, sft-frm, slty, calc.
LS: v lt gry, frm-mod hd, blky, microxln, arg.


3432.10mMD 3432.03mTVD
Inc 00.21 Az 30.96
MW : 1.40sg
PV : 20
YP : 16.5
GEL: 5/8
3461.60mMD 3461.53mTVD
Inc 00.51 Az 45.51
3489.80mMD 3489.73mTVD
Inc 00.36 Az 45.44
3519.40mMD 3519.33mTVD
Inc 00.75 Az 35.84
WOB: 1.6-14.1 t
SPP: 268-294 bar
RPM: 61-132
FLW: 3501-3526 lpm
3545.70mMD 3545.63mTVD
Inc 00.80 Az 34.10
MW : 1.40sg
PV : 15
YP : 14.5
GEL: 4.5/7
3430
3440
3450
3460
3470
3480
3490
3500
3510
3520
3530
3540
3550
3560
3570
Tf CLST: m gry - m lt gry, gnsh gry, blush wh, sft, sbblky, sli calc.
Tf CLST: lt gry, m lt gry, m gry, blush wh, sft, blky - amor, sli calc, tr micropyr.
TF CLST: m gry-m lt gry, grnsh gry, sft, sbblky, slty, calc l.P, tr micropyr
SST: clr, transl Qtz gr, lse, vf-f, sbang-sbrnd, wl srt, tr micropyr, tr dol


3574,30mMD 3574.23mTVD
Inc 00.76 Az 34.80
3606,40mMD 3606.32mTVD
Inc 1.04 Az 38.69
MW : 1.40sg
PV : 22
YP : 17
GEL: 6/11
3663.20mMD 3663.11mTVD
Inc 1.04 Az 35.74
WOB: 7.0-15.8 t
SPP: 274-300 bar
RPM: 69-129
FLW: 3493-3540 lpm
3719.90mMD 3719.82mTVD
Inc 1.12 Az 31.27
3560
3580
3600
3610
3620
3630
3640
3650
3660
3670
3680
3690
3700
3710
3720
CLST: olv blk - dk gnsh gry, sft, amor - sbblky, sli calc.
CLST: m dk gry, m gry, sft, amor-sbblky, slty I.P, sli calc-calc.
CLST: m dk gry, sft, stky, amor-sbblky, slty, calc.
CLST: m dk gry, sft, stky,


3730
3740
3750
3760
3770
3780
3790
3800
3810
3820
3830
3840
3850
3860
3747.80mMD 3747.70mTVD
Inc 0.96 Az 29.41
MW : 1.40sg
PV : 16
YP : 14
GEL: 4.5/7
MW : 1.40sg
PV : 20
YP : 17.5
GEL: 5/8
3807.90mMD 3807.79mTVD
Inc 1.35 Az 35.02
3825.80mMD 3825.68mTVD
Inc 1.30 Az 38.04
9 5/8" liner
shoe @3840mMD
LOT: 1.72sg @3845mMD
MW : 1.47sg
PV : 22
YP : 16
GEL: 5/10
3856.400mMD 3856.30mTVD
Inc 1.20 Az 32.14
amor-sbblky, slty, calc
SST: clr, transl Qtz gr, lse,
vf-f, sbang-sbrnd, pr srt
CLST: m gry, m lt gry,
lt olv gry, sft, stky,
amor-sbblky, slty, calc.
CLST: m gry, m dk gry,
lt olv gry, sft, stky, amor-
sbblky, slty, v calc.
SST: clr, trnsl Qtz gr, vf-f,
occ m-crs, sbang-sbrnd,
mod srt, calc cmt.
CLST: m gry, m lt gry, sft-frm,
blky, slty l.P, calc.
Bit#8 8 1/2"
Type MXO9DX Hughes Christensen
Nozzles 1x16, 2x18
In at 3842m Out at 3903m
1-1-NO-A-E-I-NO-CP



CLST: brn gry, md dk gry, sft, blky, calc

CLST: olv gry, sft, stky, slty l.P., calc, kaol

SST: transl wh-smoky gry qtz gr, f-v crse pred crse, sbang, slily elong qtz gr, mod hd-hd, calc cmt, trace: clay, mica, glauc

Bit#9 8 1/2"
Type HC606 Hughes Christensen
Core barrel
In at 3903m Out at 3911m
1-1-WT-A-X-I-PN-PR

SST: lse qtz gr, clr-transl, yelsh wh, vf-crse, pred crse, sbrnd, mod srt, calc cmt

Bit#9rr 8 1/2"
Type HC606 Hughes Christensen
Core barrel
In at 3911m Out at 3918m
1-1-WT-A-X-I-PN-PR

vf-crs, pred f-m, sbang-sbrnd, mod srt, tr Glauc.

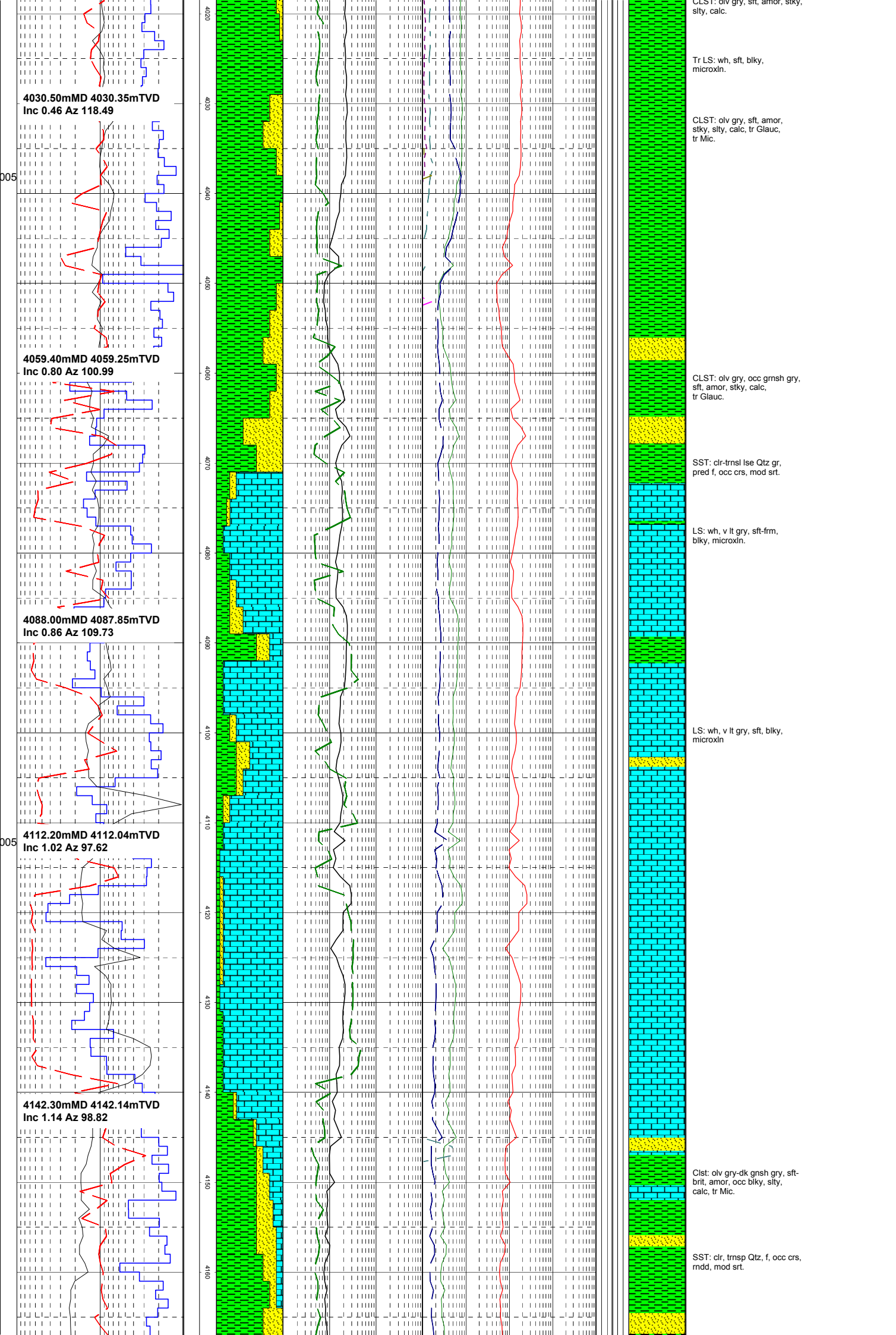
Bit#10 8 1/2"
Type LD565ATHG LYNG
Nozzles 4x12, 2x13
In at 3918m Out at 3936m
1-1-NO-A-X-I-NO-CP

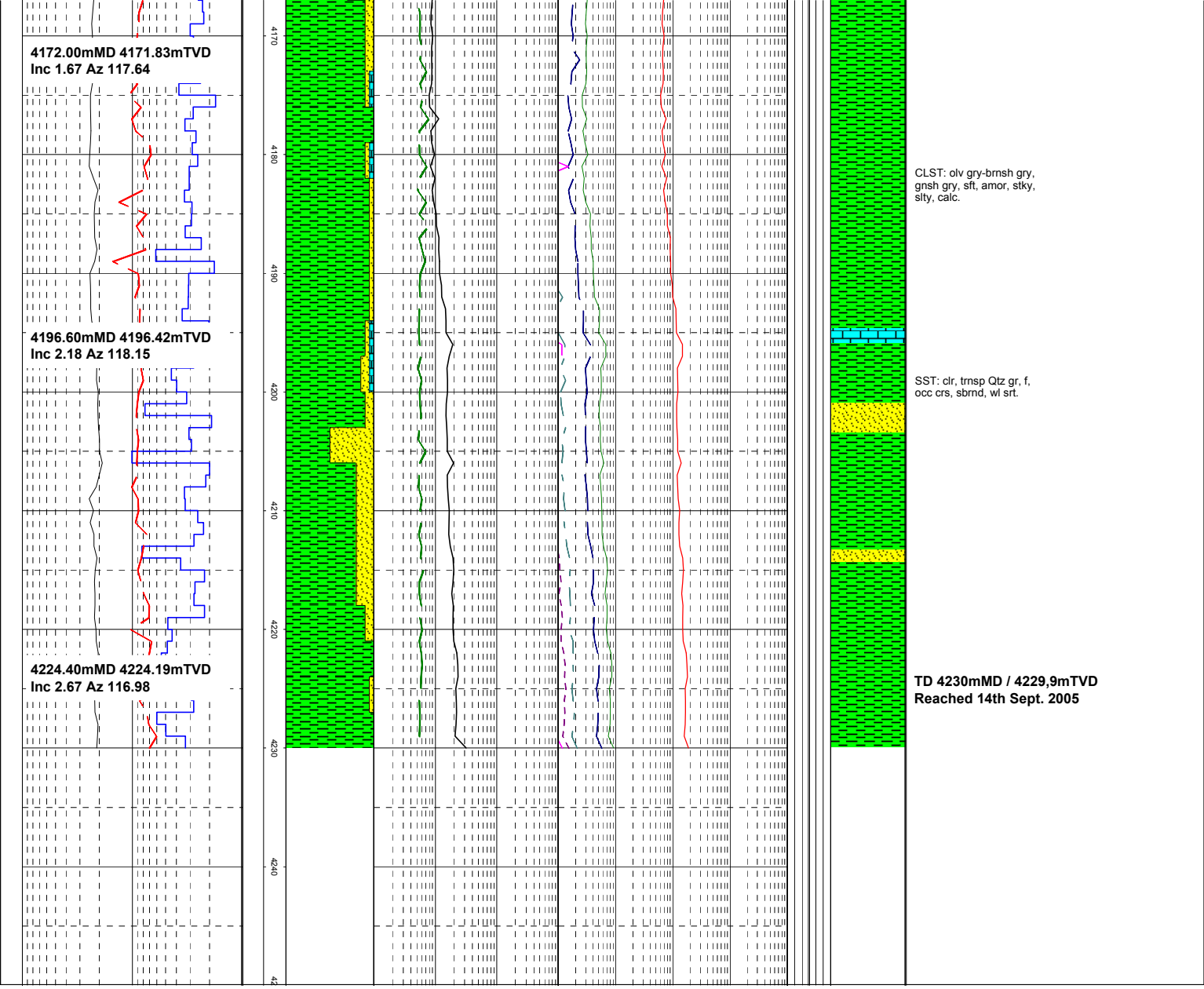
CLST: m gry, olv gry, sft, stky, blky-amor, calc.

Bit#9rr2 8 1/2"
Type HC606 Hughes Christensen
Core barrel
In at 3936m Out at 3941,5m
1-1-WT-A-X-I-PN-PR

Bit#10RR 8 1/2"
Type LD565ATHG LYNG
Nozzles 4x12, 2x13
In at 3941,5m Out at 4230m
?-?-CT-S-X-I-BT-TD

SST: clr, trnsl Qtz gr, pred lse, f-m, occ crs, sbang-sbrnd, mod srt, occ calc cmt, tr Glauc, tr Mic.


4030.50mMD 4030.35mTVD
Inc 0.46 Az 118.49
4059.40mMD 4059.25mTVD
Inc 0.80 Az 100.99
4088.00mMD 4087.85mTVD
Inc 0.86 Az 109.73
4112.20mMD 4112.04mTVD
Inc 1.02 Az 97.62
4142.30mMD 4142.14mTVD
Inc 1.14 Az 98.82
4020
4030
4040
4050
4060
4070
4080
4090
4100
4110
4120
4130
4140
4150
4160
CLST: olv gry, sft, amor, stky, slty, calc.
Tr LS: wh, sft, blky, microxln.
CLST: olv gry, sft, amor, stky, slty, calc, tr Glauc, tr Mic.
CLST: olv gry, occ grnsh gry, sft, amor, stky, calc, tr Glauc.
SST: clr-trnsl lse Qtz gr, pred f, occ crs, mod srt.
LS: wh, v lt gry, sft-frm, blky, microxln.
LS: wh, v lt gry, sft, blky, microxln
Clst: olv gry-dk gnsh gry, sft-brit, amor, occ blky, slty, calc, tr Mic.
SST: clr, trnsp Qtz, f, occ crs, rndd, mod srt.

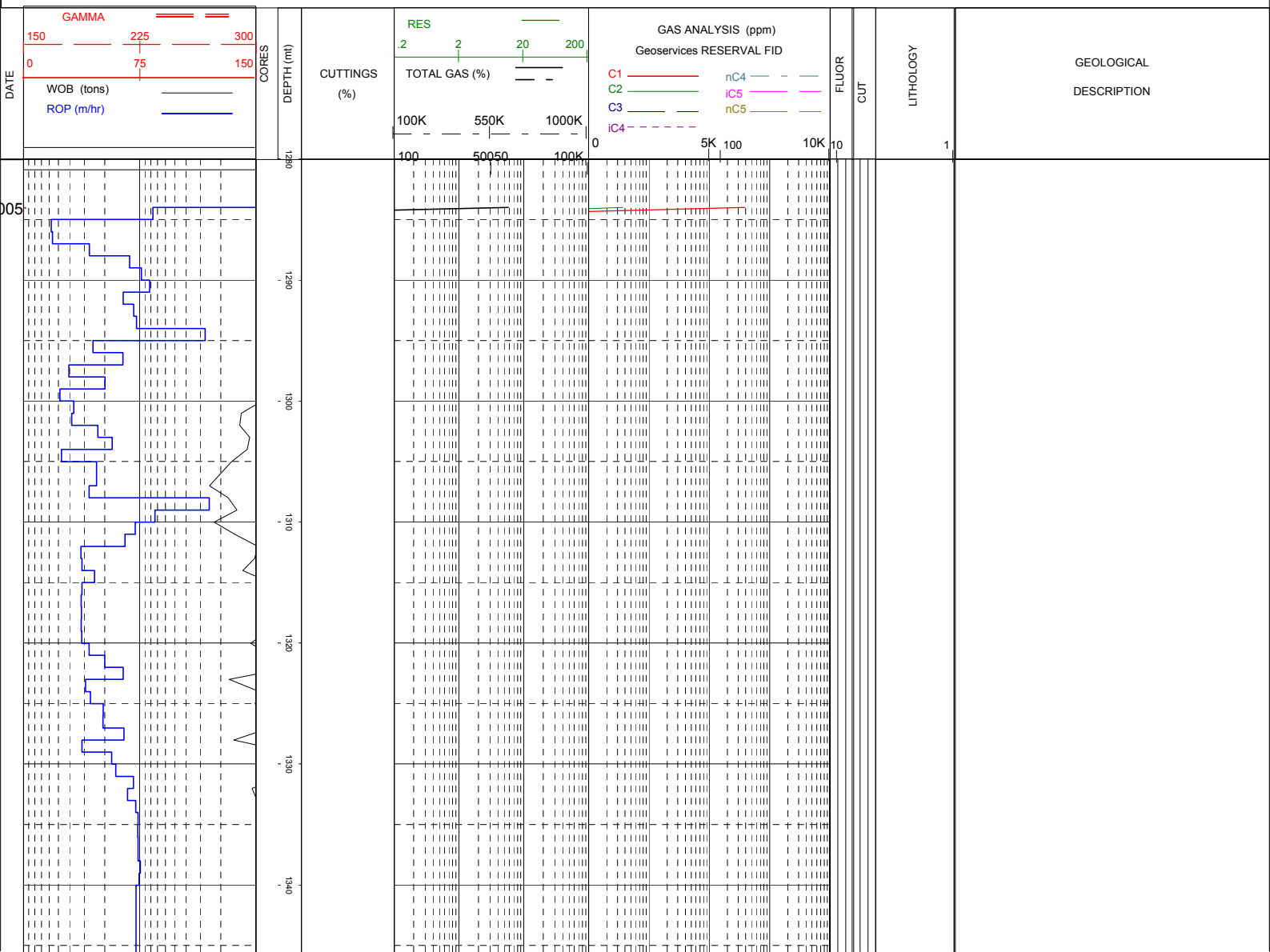

4172.00mMD 4171.83mTVD
Inc 1.67 Az 117.64
4196.60mMD 4196.42mTVD
Inc 2.18 Az 118.15
4224.40mMD 4224.19mTVD
Inc 2.67 Az 116.98
4170
4180
4190
4200
4210
4220
4230
4240
CLST: olv gry-brnsh gry, gnsh gry, sft, amor, stky, slty, calc.
SST: clr, trnsp Qtz gr, f, occ crs, sbrnd, wl srt.
TD 4230mMD / 4229,9mTVD
Reached 14th Sept. 2005

FORMATION EVALUATION LOG

FROM : TO : SCALE 1/ 500

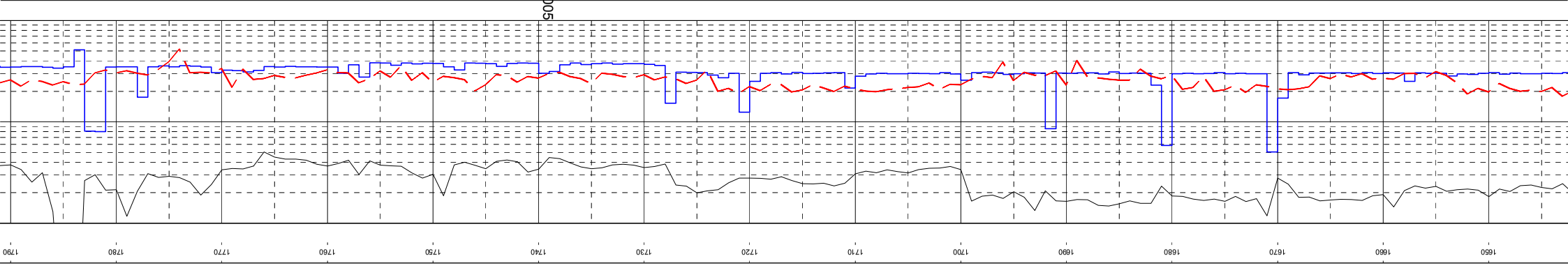
Well name	: 6302/6-U-1	Location lat	: 63deg31'40.3"N	Rig Name	: EIRIK RAUDE
Client name	: STATOIL	Location long	: 02deg45'53.5"E	Rig Type	: Semi submersible
Field	: Tulipan	UTM loc [N] (m)	: 488305	Contractor	: Statoil
Country	: NORWAY	UTM loc [E] (m)	: 7044597		
Area	: Nowegian Sea			Total Depth (m)	: 2390
Block	: 6302/6-1			TVD (m)	: 2390
		Spudded	: 01-06-05	RT - MSL (m)	: 25
		TD reached	: 07-06-05	MSL - Seabed (m)	: 1259
		Total drill days	: 7	Depth Reference	: ROTARY TABLE

Clay-shale
Calcareous clay-shale
Marl
Silty clay-shale
Sandy clay-shale
Chert
Silstone
Fine sandstone
Medium sandstone
Coarse sandstone
Calcareous sandstone
Argillaceous sandstone
Limestone
Argillaceous lime
Dolomite
Microcrystallized dolomite
Calcite
Fossils
Smell
Oil and Gas
FIT
Survey
Mud loss
Mud gain
Sidewall core
Core
Casing Top
Casing shoe

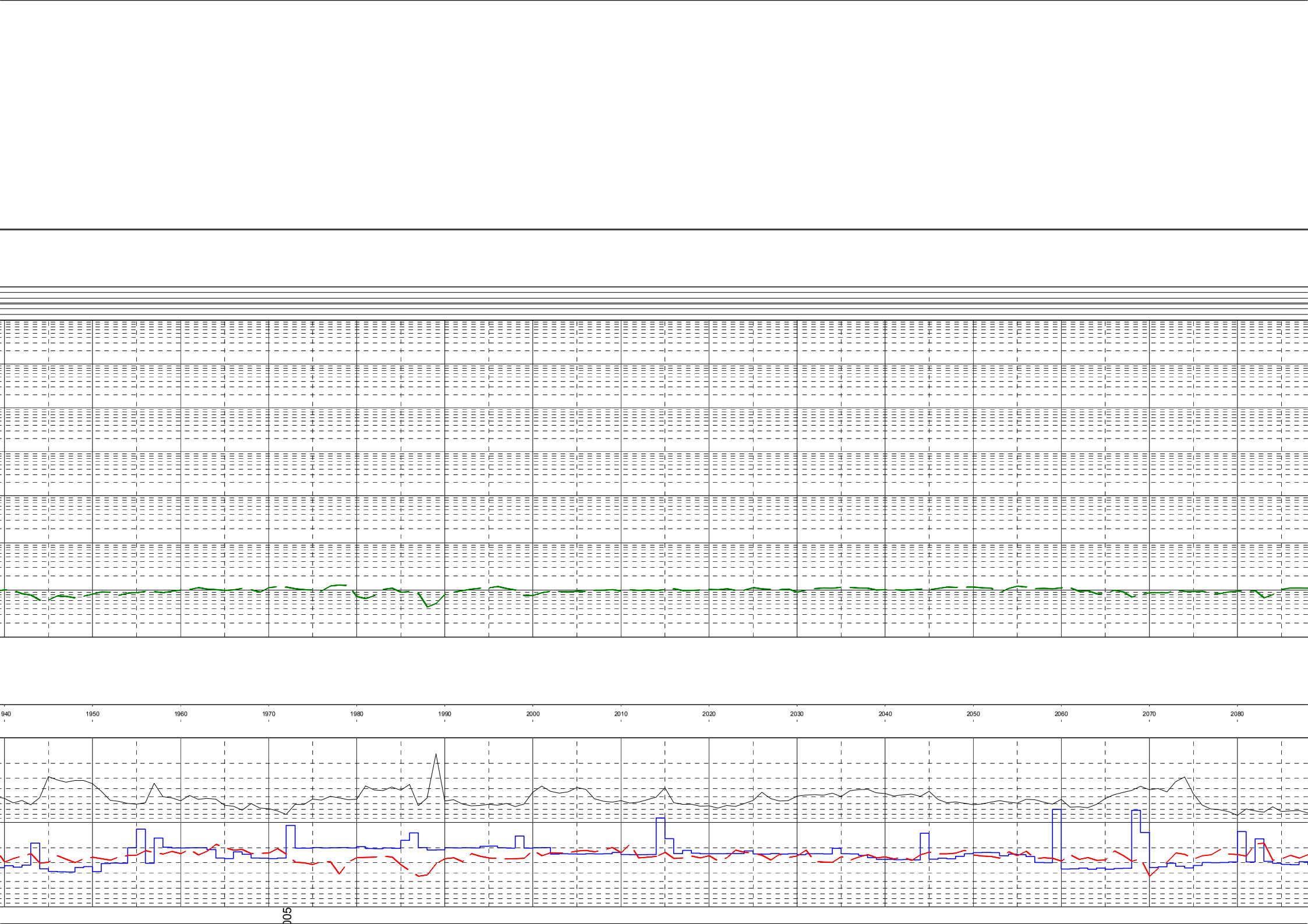


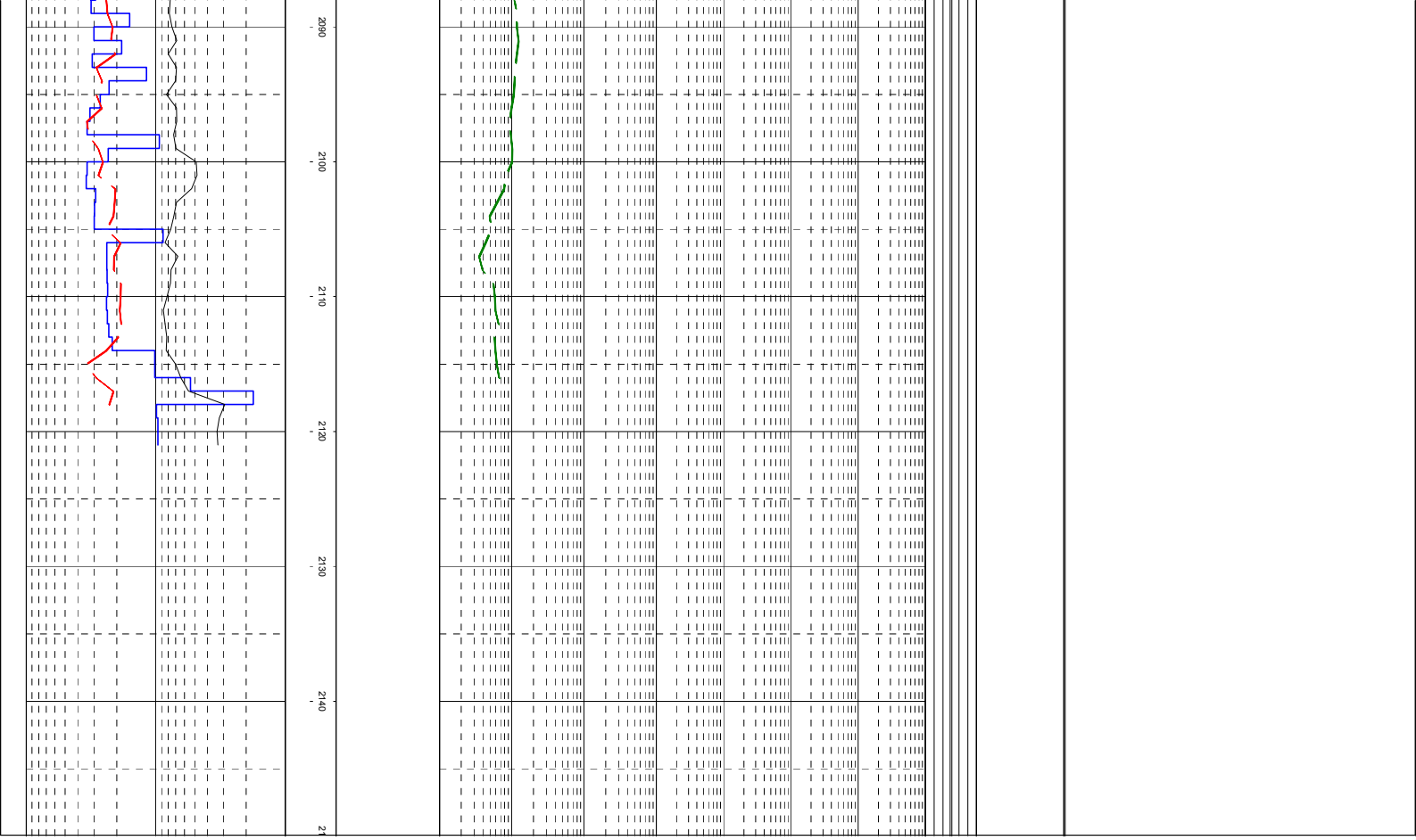
005
1350
1360
1370
1380
1390
1400
1410
1420
1430
1440
1450
1460
1470
1480
1490

1500
1510
1520
1530
1540
1550
1560
1570
1580
1590
1600
1610
1620
1630
1640


005
1790
1780
1770
1760
1750
1740
1730
1720
1710
1700
1690
1680
1670
1660
1650

1800
1810
1820
1830
1840
1850
1860
1870
1880
1890
1900
1910
1920
1930


940
1950
1960
1970
1980
1990
2000
2010
2020
2030
2040
2050
2060
2070
2080
005


2090
2100
2110
2120
2130
2140

Norske Shell A.S   Brithish Gas A.S

PARTNERE

STATOIL

WELL 6302/6-U-1

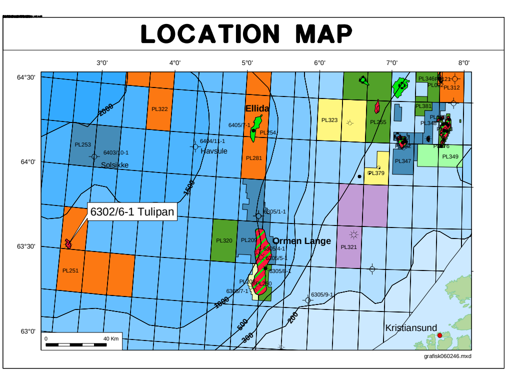
COMPOSITE LOG

PROSPECT STRUCTURE

Tulipan

AREA:	Møre Basin
LICENCE:	PL 251
COORDINATES:	latitude 63 deg. 31' 40.27" N longitude 02 deg. 45' 53.55" E
KB:	25m
WATER DEPTH:	1259m
TOTAL DEPTH:	4375m RKB
FM. AT T.D.:	Naust Formation
SPUD DATE:	01-06-2005
RIG RELEASE:	07-10-2005
WELL STATUS:	P&A
RIG:	Eirik Raude
CONTRACTOR:	Ocean Rig
GEOLOGISTS:	O.Giskeødegård, L.Rasmussen, S.Greve, B.Kjellin, A.Johanssen
PREPARED BY:	J.Basset, C.de Lesquen

LOCATION MAP



CASING DATA

30"	1364m
20"	2116.5m

LEAK OFF TESTS

VELOCITY SURVEY

LOGS RUN

CONTRACTOR:

MWD: GR-RES-DIR-PWD	1366-2122m						

COMMENTS:

The well was abandoned due to a water kick at 2114m RKB.

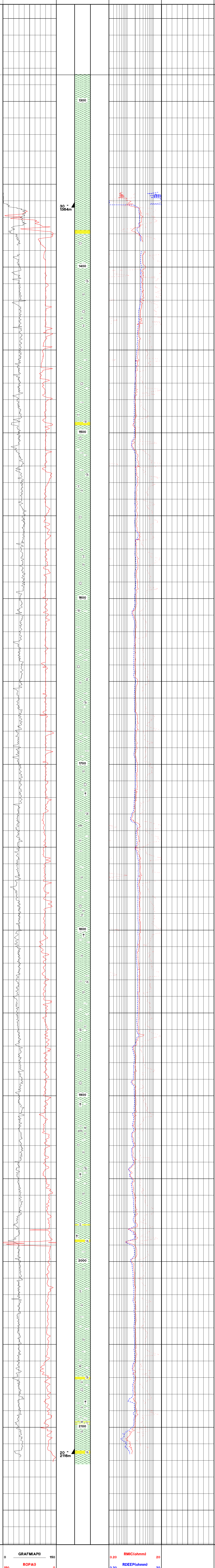
LITHOLOGICAL SYMBOLS

CONGLOMERATE · SHALE · MARL · COAL LIGNITE · FORAMS · MICA
SAND SANDSTONE · LIMESTONE · TUFF · WOOD FRAGS · BURROWS · KAOLINITE
SILT SILTSTONE · CHALK · SALT GEN'L · FOSSILS GEN'L · PYRITE · CHERT
CLAY CLAYSTONE · DOLOMITE · ANHYDRITE · SHELL FRAGS · GLAUCONITE · SIDERITE
OOZE

CUTTINGS/FLUORESCENCE · OIL SHOW · OIL/GAS SHOW · GAS SHOW

AZIMUTH & INCLINATION · SIDEWALL CORES: 1.5 SIDEWALL CORE, 2.8 NO RECOVERY, R 1.2 ROTARY SIDEWALL CORE · CORES: CORE NO · DST · RFT/FMT · SAMPLE · CASING SHOE / LINER · CHRONO STRAT UNCERTAINTY

Chron Strat			Depth	Litho Strat			Well Log	Lithological Descriptions
System	Series	Stage	Depth	Group	Formation	Depositional Environment	ROPA() 150–0; GRAFM(API) 0–150; RMED(ohmm) 0.20–20; RDEEP(ohmm) 0.20–20; RMIC(ohmm) 0.20–20	
QUATERNARY	PLEISTOCENE		1284.0	NORDLAND GROUP	NAUST FORMATION	MARINE SHELFAL BATHYAL		



Sea Bottom at 1284m RKB / 1259m MSL

All returns to sea bottom

General lithology description based on samples taken with ROV close to well head.
Parts of finer material winnowed away by current at sea bottom and when washing the samples.

SD/SST: pred ls gns, clr - trnsl, occ mlky wh, occ lt pnk - orn - lt brn, tr glau, v f - v crs - gran, v prly srtd, sbang - sbrndd, tr ang, tr rndd; tr sst frags, lt olv gry, v f, calc

CLY/CLST: olv gry, sft, amor, stky, calc

LS: off wh, mod hd, microxln

TR Pyrite, Mica, lithic frags, shell frags

In the lower part of the section the clay/claystone was not sticky and more easily washed away.

QUATERNARY · PLEISTOCENE · NORDLAND · NAUST FORMATION · MARINE SHALFAL - BATHYAL

Water kick from the depth interval between 2100 and 2116 m.
Abounded well and respudded 60m southwest.
TD of the well path was 2122m.

System	Series	Stage	Depth	Group	Formation	Depositional Environment	GRAFM(API) 0–150; ROPA() 150–0; RMIC(ohmm) 0.20–20; RDEEP(ohmm) 0.20–20; RMED(ohmm) 0.20–20	
Chron Strat				Litho Strat			Well Log	Lithological Descriptions

Norske Shell A.S British Gas A.S

PARTNERS

STATOIL

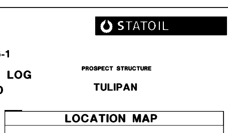
WELL 6302/6-1

COMPOSITE LOG
1 : 500

PROSPECT STRUCTURE

TULIPAN

LOCATION MAP



AREA: Møre Basin
LICENCE: Pl 251
COORDINATES: 63 deg. 31' 38.43" N
02 deg. 45' 51.56" E
KB: 25m MSL
WATER DEPTH: 1260.5m
TOTAL DEPTH: 4234m
FM. AT T.D.: Springar Fm.
SPUD DATE: 23.06.2005
RIG RELEASE: 07.10.2005
WELL STATUS: P&A
RIG: Eirik Raude
CONTRACTOR: Ocean Rig
GEOLOGISTS: A.Johanssen, B.Kjellin, J.Wayne, L.Rasmussen, O.Giskeødegård, S.Greve, E.Undersrud, Ø.Hovden, J.Gilpin, C.de Lesquen
PREPARED BY: J.Basset / C.de Lesquen

CASING DATA		LEAK OFF TESTS	VELOCITY SURVEY
30"	1363.0m		Contractor: Schlumberger.
20"	1959.8m	FIT:1.12sg	Zero offset and lookahead at TD of
16"	2380.3m	1.60sg	17 1/2" hole section.
13 3/8"	3035.0m	FIT:1.49sg	Zero offset at TD of the well.
9 5/8"	3840.0m	1.72sg	

LOGS RUN — CONTRACTORS: MWD: BHI WIRELINE: SCHLUMBERGER

MWD	Interval	Wireline	Interval
GR-RES-DIR-PWD	1363-1965m	1A: PEX/DSI/HRLA	MISRUN
GR-RES-DIR-PWD	1960-2390m	1B: PEX/DSI/HRLA	1870-3020m
GR-RES-DIR-PWD	2380-3842m	1A: CSI-GR	1305-3023m
GR-RES-DIR-ECD	3840-3903m	2A: PEX-DSI-HRLA	MISRUN
		2B: PEX-DSI-HRLA	3035-3844.5m
		2A: MSCT	3124.8-3826.5m

COMMENTS:

Due to shallow water flow the well had to be respudded after setting the 20" casing at 2116.5m.
This well is named 6302/6-U-1
The rig was moved 62.5 m towards SW and respudded. A minor water flow was observed after cementing the 20" casing.

For the 16" liner to be run, the hole was first drilled as a 17" hole size and then opened up to 20" hole hole size.
For the 13 3/8" casing to be run, the hole was forst drilled as a 14 3/4" hole size and the opened up to 17 1/2" hole size.

LITHOLOGICAL SYMBOLS

CONGLOMERATE, SHALE, MARL, COAL LIGNITE, FORAMS, MICA, SAND SANDSTONE, LIMESTONE, TUFF, WOOD FRAGS, BURROWS, KAOLINITE, SILT SILTSTONE, CHALK, SALT GEN'L, FOSSILS GEN'L, PYRITE, CHERT, CLAY CLAYSTONE, DOLOMITE, ANHYDRITE, SHELL FRAGS, GLAUCONITE, SIDERITE, OOZE

CUTTINGS/FLUORESCENCE — OIL SHOW — OIL/GAS SHOW — GAS SHOW

AZIMUTH & INCLINATION — SIDEWALL CORES: 1.5 SIDEWALL CORE; 2.8 NO RECOVERY; R 1.2 ROTARY SIDEWALL CORE — CORES: CORE NO — DST — RFT/FMT: SAMPLE — CASING SHOE / LINER — CHRONO STRAT UNCERTAINTY

Chron Strat	Litho Strat	Well Log	Lithological Descriptions

Chron Strat	Litho Strat	Well Log	Lithological Descriptions