STATOIL

Final Well Report
PL 128, WELL 6608/11-4

UPN
LET OPR
Harstad, November 2004

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Final Well Report
Well 6608/11-4
Linerle, PL128

04D94*224014

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Title:
Final Well Report **Well 6608/11-4** **Linerle, PL128**

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Dispensation and non-conformance

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

Geology and formation data report

Drilling report

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1 Summary

Well 6608/11-4 was a vertical exploration well drilled from 378m to 2317m RKB. The well was designed with a 36", 12 ¼" and 8 ½" section. A 32" conductor was planned hammered down. This attempt failed and a conventional 30" conductor was set. The 9 5/8" casing was set above a prognosed pressure build-up zone. The well was drilled, logged, plugged and abandoned in 24.1days.

1.1 Well data record

Well name	:	6608/11- 4	
Type of well	:	Exploration	
Prospect	:	Linerle	
Country	:	Norway	
Area	:	Haltenbanken	
License	:	PL 128	
Licencees	:	Statoil ASA (Operator)	40.45 %
		Petoro AS	24.55 %
		Norsk Hydro ASA	13.50 %
		Eni Norge AS	11.50 %
		AS Norske Shell	10.00 %
Drilling unit	:	West Navigator	
Type	:	Drillship (DP)	
Water depth	:	342 m MSL	
Air gap	:	36 m	
On license	:	29.04.2004	
Spud	:	01.05.2004	
Rig released	:	23.05.2004	
Formation at TD	:	Triassic Red Beds	
Geographic co-ordinates	:	66° 11' 56.25" N 08° 25' 47.97" E	
Datum/Spheroid	:	Int. 1924/ ED-1950	
UTM	:	UTM Zone 32, CM 09° E 7 342 390 m N 474 330 m E	
5m in direction 078.1° grid (077.6° true) from intended well position			
Seismic location	:	Seismic survey ST0103, Inline 1070, Cross-line 2281.	

All depths in this report refer to RKB unless otherwise stated.

Location map

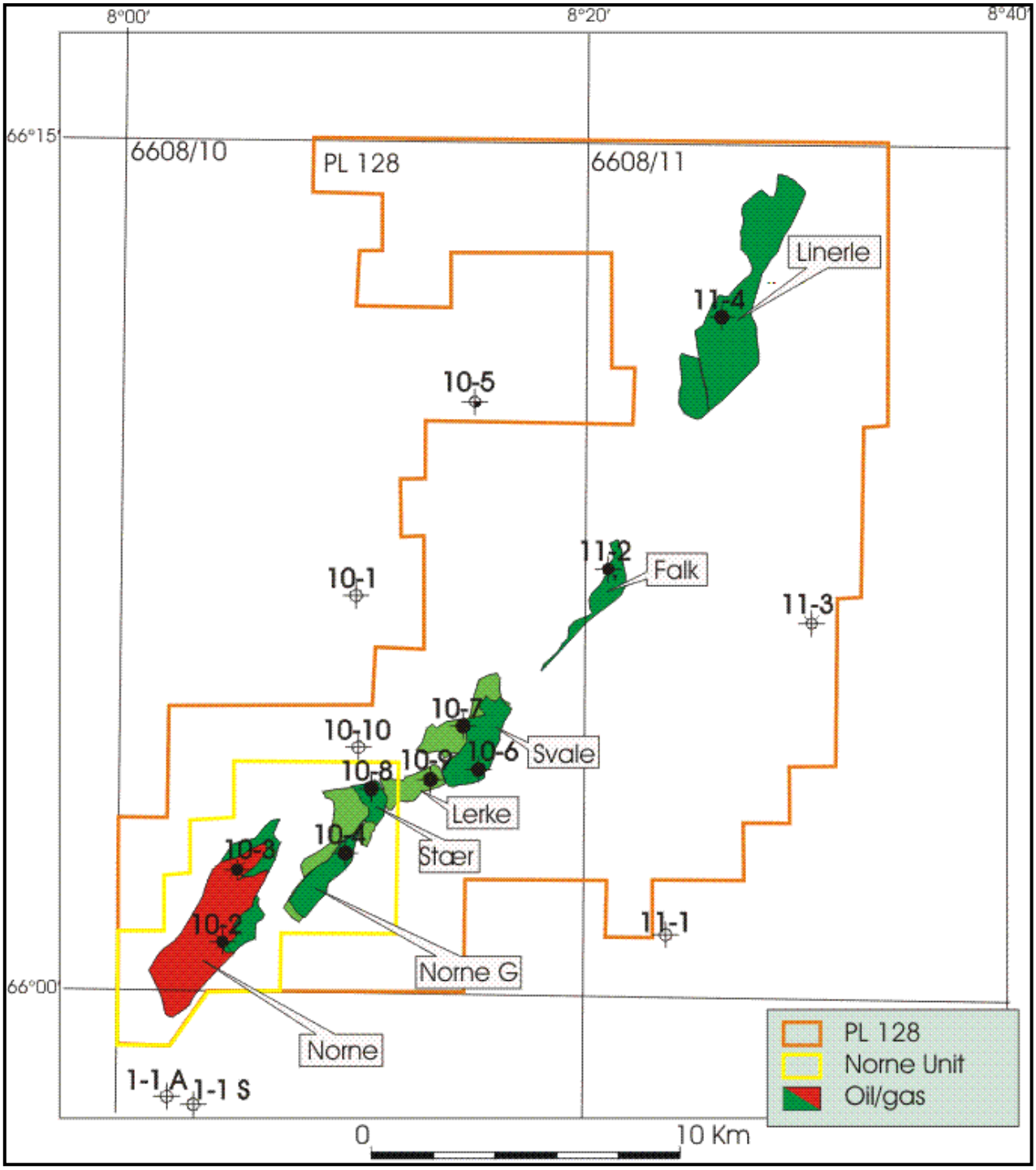


Figure 1.1

1.2 Well objectives

The primary objective of well was to prove hydrocarbons in the Lower Jurassic sandstones of the Tilje and Åre Formations.

1.3 Results of the well

The well was spudded in a water depth of 342 m MSL and drilled to a total depth of 2317m. No shallow gas was observed, as prognosed.
The top of the reservoir, the Tilje Formation, was encountered at 1656m. An oil column of 18m (1656-1674m) was present in the Tilje and Åre 2 Formation, proved by pressure points and three oil samples from 1656m, 1663m and 1672.5m. Three water samples were taken at 1677.5m, 1680.5m and 1708m.
Sandstones with good reservoir properties were also encountered in the Åre 1 Formation and in the Triassic Grey Beds
Two mini DSTs were performed using the MDT dual packer setup.
Two cores were cut in the interval 1662 – 1714 m in the Tilje and Åre 2 Formation.
The well was terminated in the Triassic Red Beds at 2317m.

1.4 Drilling summary

1.4.1 Casing

Casing	Shoe depth [m MD]	LOT / FIT [Equivalent mud weight]
30"	426	NA
18 ¾" WH x 9 5/8" casing	1349	Extended LOT: 1.55 g/cm³

Table 1.1 Casing

1.4.2 Drilling fluids

Section	Section TD [m MD RT]	Max. mud weight [g/cm³]	Mud type
36"	425 (17 ½" @ 428)	1.03	Seawater / high visc. sweeps
12 1/4"	1357	1.03	Seawater / high visc. sweeps
8 1/2"	2317	1.30	Glydril (water based KCl/Pac/glycol)

Table 1.2 Drilling fluids

1.5 Data acquisition summary

See Figure 1.2.

PL 128

RKB - MSL: 36 m

Water Depth: 342 m MSL

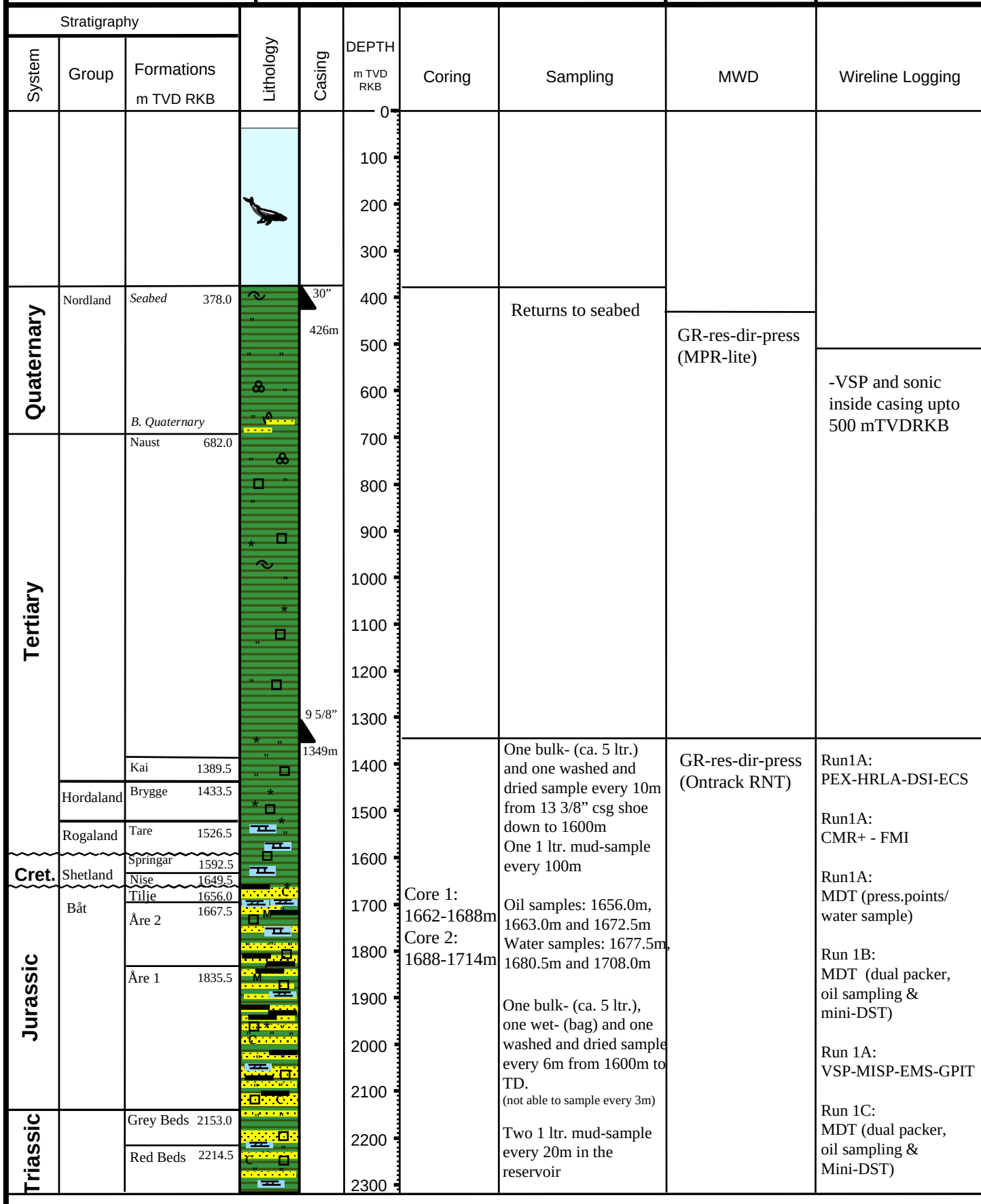
Data acquisition summary
Well 6608/11-4
Linerle

North East Segment

STATOIL

Made by: ØH/SvTy

Date: 04.10.2004



TD: 2317m TVD RKB

Fig. 1.2

2 Dispensation and non-conformances

One exemption from the Statoil regulations (WR0436) were written and approved for the Linerle operations :

- **Cutting of WH 4 m below seabed (Synergi no. 263454).**

Due to the design of the WH extension joint and the length of the 20" extension down to the 9 5/8" X/O, the WH had to be cut 4 m below seabed. The requirements (WR436)states that the WH shall be cut 5 m below seabed.
No consequences were identified.

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

3.1 General comments

Statoil is satisfied with the HSE performance of the drilling contractor and the service companies during the Linerle well. High focus on reporting unsafe conditions, near misses and accidents was maintained throughout the operation. The good HSE results should also be considered in light of the preconduct test.

3.1.1 Observation cards (OBS) and Synergi

A total number of 440 observation cards were filed on the rig during the operation, average to approximately 19 a day. Of these reports Statoil and service companies generated 96.

35 entries were made into Statoils Synegi system.

3.1.2 Comments to OBS/Synergi reports

Among the reported accidents/incidents/conditions there were :

- No LTI
- No red incidents (High Risk Potential)
- No medical treatment - or first aid cases
- One yellow incident (Medium Risk Potential)
- No acute discharge
- Three falling objects

The incident rated as yellow (Medium Risk Potential) occurred in connection with the preconduct operation when a bolt from the hydraulic conductor driving hammer came loose and fell two meters onto the HPU roof. The medium risk rating was related to the possibility of the bolt coming loose in a different operational situation.

The other two falling objects were considered as minor incidents.

3.2 Non-conformance

Title	Synergi no.	Date	Comments
Conductor inclination increased to 1.7 degrees	263746	02.05.2004	
Boulders and drilling problems	116653	02.05.2004	
Hammer did not fully enter into conductor when preparing for preconduct	263734	02.05.2004	
Downtime due to problems with pipe handling system	263938	04.05.2004	
Software problems in pipe handling system.	263941	04.05.2004	
Problems with DDM link hanger assembly	264199	05.05.2004	
Instrument problems with pipehandling system	264200	05.05.2004	
Problems with bulk cement supply when starting cement 9 5/8" casing.	264569	07.05.2004	
Flowline valve failed to open.	264682	09.05.2004	
Missing inner barrel spacer sub	264776	09.05.2004	
Schlumberger WL: Problems with MDT-tool	85681	14.05.2004	
Schlumberger WL: Not able to communicate with lower part of tool string.	86111	15.05.2004	
Schlumberger WL: Tool problems MDT/oil sampling/mini DST	91307	16.05.2004	
Schlumberger WL: Not able to start pump for mini-DST	91315	16.05.2004	
Stuck MDT-tool	91558	16.05.2004	
Unable to remove WL-entry plug on top-drive	91808	17.05.2004	
On the logging tool, strain and quartz gauges not working.	96981	20.05.2004	
Problems pulling Wear Bushing	107178	23.05.2004	

Table 3.1 Summary of registered Non Conformances

3.3 Experience summary

Section	Experience (subject and description)	Immediate solution	Solution recommended for future
36”			
Preconduct	The Preconduct concept was tested on the tophole to potentially pre-qualify the equipment and method for the Barents Sea campaign. The Preconduct concept as a tophole system were the conductor is hammered down with a hydraulic hammer section, mainly to reduce discharge to sea.	The field experience had to be aborted to several problems, and the tophole was drilled and a conventional conductor was run and cemented.	Reference is made to the not yet published “Preconduct” experience report.
BHA	A Red Baron Heavy-Duty 26” x 36” HO with inserts was used for the top hole, as boulders were expected.	The section was drilled with very low WOB and therefore very low ROP to avoid any angle build-up. The body and the roller shanks on the HO was severely worn out.	Evaluate if it is necessary with inserts for these formations, as milled tooth cutters drills more effective and has been strong enough for these formations on earlier wells.
12 1/4”			
Drilling practise	12 ¼” hole was drilled directly out of the 30” conductor.		No problems encountered. This has been done in several “slimhole design” wells without any problems, and is recommended for future wells.
Mill-tooth bit	The 929 m long section was drilled with an average ROP of 81 m/hr.	This ROP is approx. 28 % faster then best offset well (which was drilled with the same bit design).	Consider using Security EBXSC1S (1-1-7W) on future wells.
Wiper trip	A wiper trip was performed to TD after pumping out of hole due to overpull of 10-15 t.	No further resistance was observed on the wiper trip.	Based on experiences from the latest offset wells were no wiper trip has been performed, a wiper trip is not necessary in these formation with vertical hole.
8 1/2”			
PDC bit	Drilled 8 ½” hole with an average ROP of 38 m/hr. No indications of bit balling observed.		
ECD readings	“Unexpected” high ECD readings observed while drilling 8 ½” section (up to 1.57 SG with 1.30 SG mud).	Used 5” DP in open hole, 5 ½” DP in 9 5/8” casing.	Be aware that the large OD of the 5 ½” DP might resulted in very high ECD readings.
P & A			
WH housing length	Due to the short length of the 20” WH extension joint down to the 9 5/8” X/O, the WH was cut 4 m below seabed (WR 436 requires 5 m).	An exemption to WR436 was written and approved.	The 20” interval on the extension joint must be extended, if possible, to full fill all requirements.

Table 3.2

3.4 Time distribution

Total time	**24,1 days**
Total down time	**87,5 hrs**
Waiting on weather (WOW)	**0,0 hrs**

Ops. Factor: $= \frac{Total\_time - Down\_time - WOW}{Total\_time - WOW} * 100$	**84,9%**

Table 3.3

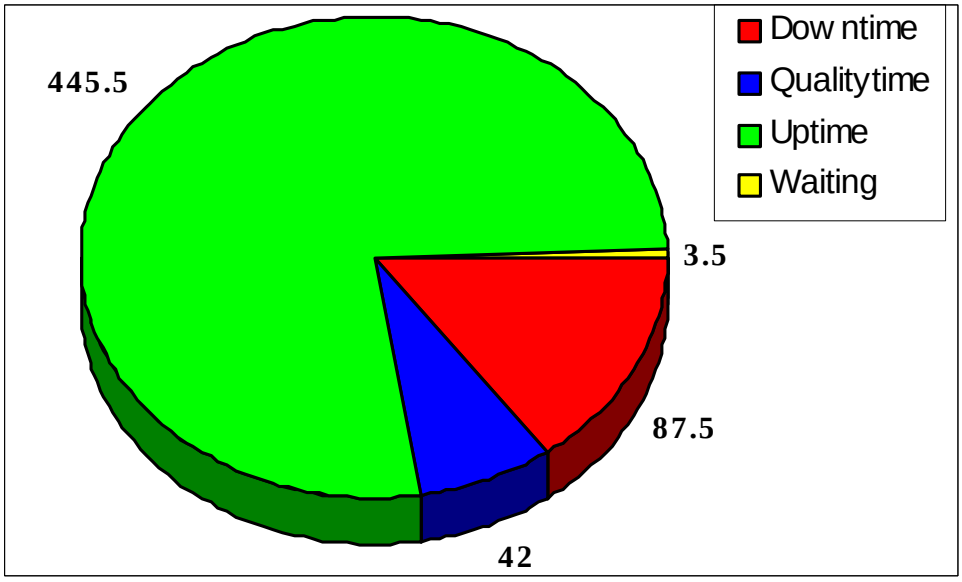


Fig. 3.1 Time distribution

Company	Description	D-time (hrs)	Quality cost (NOK)
Statoil	Boulders, stuck MDT, WB	28.5	2.696.100
IHC Hammer	Pre-conduct	27.0	2.554.200
Smedvig	Pipehandling, maintenance, top drive	15.5	1.466.300
Schlumberger	Communication, MDT-tool, mini DST	11.0	1.040.600
Security DBS	Waiting on barrel spacer sub	5.0	473.000
Halliburton	Bulk cement supply 9 5/8" casing	0.5	47.300
Total		**87.5**	**8.277.500**

Fig. 3.4 D-time distribution by company in hrs

4 Geology and formation data report

4.1 Geological setting and results

The well was drilled on the north-east segment of the Linerle prospect NNE of the Norne field, and was the first to be drilled in the prospect.

Block 6608/11 is situated in the southern part of the Nordland II area. The NE-SW trending Revfallet Fault Complex separates the block in two structural provinces, the Dønna Terrace and the bounding Nordland Ridge to the east. To the west the Ytreholmen Fault Zone bound the Dønna Terrace towards the Træna Basin.
The structural framework of the Dønna Terrace was mainly established during the Upper Jurassic/Lower Cretaceous extensional tectonics in the region. Later structuring is mainly related to the Cretaceous and Tertiary basinal subsidence.
The Linerle prospect is located on the Dønna Terrace c. 8 km NNE of the Falk discovery. It is located in a SW dipping fault block that is down-faulted between two deeply truncated horst blocks along NE-SW trending bounding faults. Melke, Tilje and Åre formations constitute the reservoir interval, but the well penetrated only the Tilje and Åre Formations

The well penetrated rocks of Quaternary to Triassic age. TD of the well is in the Triassic Red Beds at 2317m.

4.2 Shallow gas results

The well was drilled with seawater and returns to seafloor down to 1357 m. No shallow gas was observed. MWD logs were used in the evaluation and a ROV was used to observe at the wellhead.

4.3 Stratigraphy

The stratigraphy is based on the biostratigraphy, wireline/MWD logs and correlation to nearby wells. The stratigraphy of the well is shown in table table 4.1, table 4.2 and figure 4.2.
Details on the biostratigraphy are found in a separate biostratigrapy report.

Table of chronostratigraphy

Stratigraphic succession		**Interval m MD**
Tertiary	Upper Miocene (top not seen)	1450 - 1470m
	Middle Miocene	1480 - 1483m
	Lower Miocene	1490 - 1493m
	----hiatus---	
	Middle Eocene	1500 - 1510m
	Lower Eocene	1520 - 1580m
	Upper Paleocene	1590 - 1592m
----hiatus---		1592m
Cretaceous	Upper Campanian?	1602 - 1603m
	Upper Campanian	1605 – 1623m
	Middle Campanian	1632 - 1647m
	Lower Campanian	1650 - 1653m
----hiatus---		1653 - 1656m
Jurassic	Pliensbachian	1656 - 1664m
	Sinemurian	1665 - 1788m
	Sinemurian- Hettangian	1792 - 1830m
	Hettangian	1842 - 2076m
Triassic	Rhaetian	2082 - 2256m
	Upper Norian	2268 - 2317m

Table 4.1

Table of lithostratigraphy

Formation tops	Prognosis			Observation			
	m MD RKB	m TVD RKB	m MSL	m MD RKB	m TVD RKB	m MSL	Diff. from prog
NORDLAND GP	**378**	**378**	**342**	**378.0**	**378.0**	**342.0**	0
Quaternary section	378	378	342	378.0	378.0	342.0	0
Naust Fm	683	683	647	682.0	682.0	657.0	-1
Kai Fm	1331	1331	1295	1389.5	1389.5	1353.5	-6
HORDALAND GP	**1445**	**1445**	**1409**	1433.5	1433.5	1497.5	-11.5
Brygge Fm	1445	1445	1409	1433.5	1433.5	1497.5	-11.5
ROGALAND GP	**1566**	**1566**	**1530**	1526.5	1526.5	1490.5	-39.5
Tare Fm	1566	1566	1530	1526.5	1526.5	1490.5	-39.5
SHETLAND GP	**1616**	**1616**	**1580**	1592.5	1592.5	1556.5	-23.5
Springer Fm	1616	1616	1580	1592.5	1592.5	1556.5	-23.5
Nise Fm	----	----	----	1649.5	1649.5	1616.5	----
BÅT GP	**1662**	**1662**	**1626**	1656.0	1656.0	1620.0	-6
Tilje Fm	1662	1662	1626	1656.0	1656.0	1620.0	-6
Åre 2 Fm	1681	1681	1645	1667.5	1667.5	1631.5	-13.5
Åre 1 Fm	1847	1847	1811	1835.5	1835.3	1799.3	-11.7
Triassic Grey Beds	2156	2156	2120	2153.0	2153.0	2117.0	-3
Triassic Red Beds	----	----	----	2214.5	2214.5	2178.5	----
TD (discovery case)	**2356**	**2356**	**2320**	2317	2316.7	2280.7	-39.3

Table 4.2

4.4 Lithological description

No description of the lithology from seafloor to 1357m due to returns of cuttings to the seafloor. The formation tops in this interval is based on log signatures correlated with the nearest wells.

Quaternary

Quaternary sediments are expected from seafloor to 682m. The base is uncertain.
The sediments are clay dominated. Boulder is expected to be present in the interval 383 – 420m

Tertiary

Naust Formation **682.0 – 1389.5 mMD, (657.0 – 1353.5 mTVD MSL)**
System: Tertiary
Series: Upper Pliocene?

The top of this formation is picked based on correlation to 6608/11-2, but it is uncertain.
Only the lowermost part has been sampled and described. It consists of a massive claystone.

The claystones were medium grey to occasionally olive grey, soft to firm, slightly calcareous, slightly to moderately silty, slightly to very sandy (very fine to trace medium to granule), moderately micromicaceous, trace micropyrite, rare glauconite, with traces of black mafic minerals. A trace graded to argillacoeus, very fine grained sandstone. There also a good trace of very coarse to granule sized, angular, crystalline rock fragments, which probably were broken from floating pebbles in the claystone.

Kai Formation **1389.5 – 1433.5 mMD, (1353.5 – 1497.5 mTVD MSL)**
System: Tertiary
Series: Upper Miocene - Upper Pliocene?

The top of the Kai Formation is picked on a increase in GR and decrease in sonic velocity.
It is composed of claystone as in the Naust Formation above. The pick op this top is uncertain.

Brygge Formation **1433.5 – 1526.5 mMD, (1497.5 – 1490.5 mTVD MSL)**
System: Tertiary
Series: Lower Eocene – Upper Miocene

The top of the Brygge is picked at a decrease in GR values, together with a increase in sonic velocity. It is composed of claystone and subordinate interbedded/intergraded siltstone.

In the upper half, the claystone is medium grey to occasionally olive grey, soft to firm, slightly calcareous, slightly to very silty, slightly to very sandy, moderately micromicaceous, trace of micropyrite, and with traces of glauconite. In the lower half the claystone is pale yellowish green, light bluish green, soft to firm, blocky, flaky, and non calcareous.

The siltstone is brownish grey, soft, subblocky, non calcareous, argillaceous, locally sandy, with abundant glauconite and grades in part to silty claystone and silty/argillaceous sandstone. A hiatus is interpreted between 1493m and 1500m, based on the biostratigraphy.

Tare Formation **1526.5 – 1592.5 mMD, (1490.5 – 1556.5mTVD MSL)**
System: Tertiary
Series: Upper Palaeocene - Lower Eocene

This top is picked on a marked decrease in GR values. It is predominantly claystone with occasional marl and stringers of limestone.

The claystone is light bluish green, light brown, olive grey, soft to firm, none to occasionally slightly calcareous, and occasionally slightly silty. The claystone is expected to be tuffaceous in parts

The limestone is greenish white, light grey, blocky, firm to hard, occasionally very argillaceous, occasionally very silty and occasionally very sandy.

Cretaceous

Springer Formation **1592.5 – 1649.5 mMD, (1556.5 – 1613.5 mTVD MSL)**
System: Upper Cretaceous - Tertiary
Series: Lower Campanian - Upper Palaeocene?

The top of the Springer Formation is picked on increase in GR, a small but noticeable decrease in sonic velocity, together with an increase in resistivity. It comprises claystone with traces of limestone.

The claystone is light grey, greenish grey, becoming greenish grey to olive grey towards base, crumbly to firm, blocky, non calcareous, with traces of pyrite and glauconite towards the base.

The limestone is greenish white, light grey, blocky, firm to hard, occasionally very argillaceous, occasionally very silty and occasionally very sandy.

Nise Formation **1649.5 – 1656.0 mMD, (1613.5 – 1620.0 mTVD MSL)**
System: Upper Cretaceous - Tertiary
Series: Lower Campanian - Upper Palaeocene?

The top of the Nise Formation is picked on a decrease in sonic velocity. The formation consists of claystone and described in general as the claystone of the Springar Formation

Jurassic

Tilje Formation **1656.0 – 1667.5 mMD, (1620.0 – 1631.5 mTVD MSL)**
System: Upper Jurassic
Series: Sinemurian-Pliensbachian

The top of the Tilje Formation is picked at the top of fine grained sandstone which constitutes the main part. Stringers of claystone, siltstone, limestones/calcareous cemented sandstone occurs. A cola layer is present. The lower part of the Tilje Formation was cored.
The sandstone is oil bearing and described as medium dark brown, speckled off white to pale brown, soft to friable, very fine, locally slightly silty, well sorted, angular to subrounded, non to slightly dolomitic, no visible cement, good trace black lithic/mafic grains, trace mica, rare micropyrite, very good visible porosity. Fair to good oil shows occurs.

Åre Formation **1667.5 – 2153.0 mMD, (1631.5 – 2117.0 mTVD MSL)**
System: Upper Jurassic
Series: Rhaetian - Sinemurian

The Åre Formation is devided in Åre 2 and Åre 1 Formations with tops at 1667.5 and 1835.5m repectively. The upper part of the Åre Formation was cored down to 1714m. It consists of interbedded sandstones, siltstones and claystones. Intervals with coal layers and carbonaceous claystones occur occasionally through the entire formation. Limestone stringers are described.

The sandstones were medium light to light grey, pale yellowish brown, pale olive grey, soft, very fine to fine, becoming mainly medium, moderately to well sorted, subangular to mainly subrounded, slightly argillaceous in part, micaceous, occasional carbonacoeus inclusions, locally very micaceous and carbonaceous laminations, good visible porosity. Fluorescence was described down to 1671m.

The siltstones were in part medium to medium dark brown, in part medium to medium dark greyish brown, in part medium light to dark grey, crumbly, non calcareous, locally moderately to very sandy, mainly non to trace sandy, in part slightly argillaceous, mainly moderately to very argillaceous, slightly to mainly moderately to very micromicaceous, commonly slightly microcarbonaceous, with traces of micropyrite.

The claystones were medium light to dark grey to locally brownish grey, crumbly to occasionally firm, non calcareous, slightly to commonly moderately to very silty, moderately to very micro micaceous, slightly to very carbonaceous, occasionally grading in part to argillaceous siltstone.

The coal was black, firm to hard and brittle, shiny in part, earthy and argillaceous in parts. Occasionally it graded to carbonacous claystone, which was medium dark brown to brownish black, soft to firm, non calcareous, moderately to very carbonaceous, and non to slightly micromicaceous. Pyrite was present.

The limestone stringers were white to off white, poorly to moderately indurated, microcrystalline in part, micritic in part, very dolomitic, and argillaceous.

Below the cored interval the cuttings were of poor quality, and the description was difficult.

Triassic

Grey Beds **2153.0 – 2214.5 mMD, (2117.0 – 2178.5 mTVD MSL)**
System: Triassic
Series: Rhaetian

The top of the Grey Beds are picked below the massive sandstones in the Åre Formation. The Grey Beds comprises interbedded claystone and sandstone. Abundant limestone stringers

The sandstones and claystones are indistiguishable from the loose sands and soft amorphous claystones as described for the Åre Formation above.

The limestones were white to light grey, with occasional black specks, soft to firm, micritic in part, microcrystalline in part, locally sandy, and locally argillaceous.

Red Beds **2214.5 – 2317.0 mMD, (2178.5 – 2280.7 mTVD MSL)**
System: Triassic
Series: Upper Norian - Rhaetian

The upper part consists of interbedded claystone and sandstone, while the bottom half is mainly claystone. Traces of limestone were present throughout.

The sandstones were found as loose quartz, clear to translucent, trace off-white opaque, very fine to mainly fine to medium to occasionally trace coarse, poorly to moderately sorted, subangular to rounded, with a trace of loose mica

The claystones were multi-coloured, medium light to medium brown to reddish brown to trace purplish brown, pale to medium grey, occasionally purplish grey and greenish grey, rare yellowish brown, soft to dominantly firm, moderately to very calcareous, trace to slighty micromicaceous, and non to slightly silty, but became almost exclusively brown to reddish brown towards the base.

The limestones were white to light grey, with occasional black specks, soft to firm, micritic in part, microcrystalline in part, locally sandy, and locally argillaceous.

Structure map, top Åre Fm

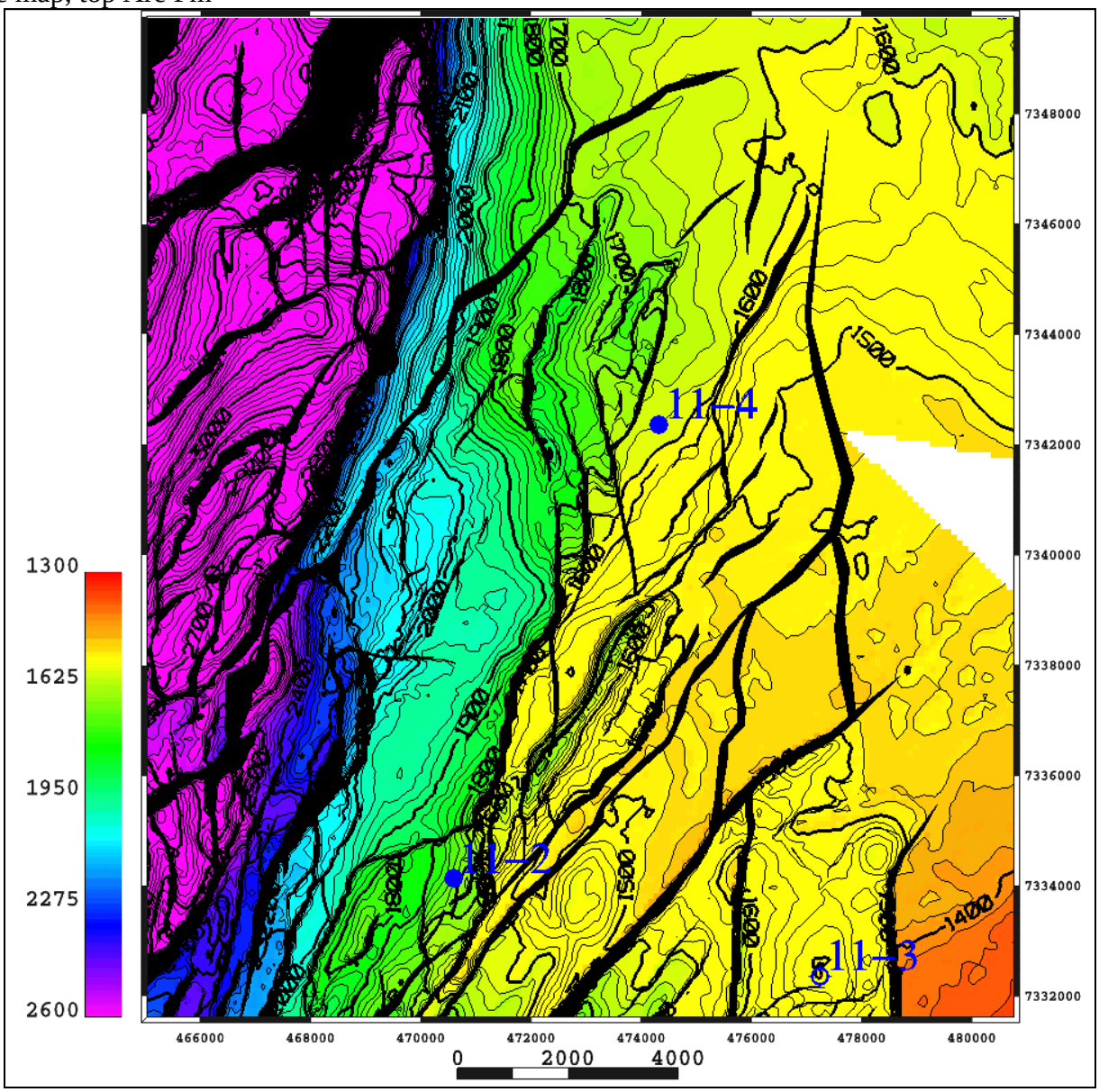


Fig 4.1

PL 128

RKB - MSL: 36 m

Water Depth: 342 m MSL

Lithology prognosis vs. observation Well 6608/11-4, Linerle

North East Segment

STATOIL

Made by: ØH

Date: 19.10.2004

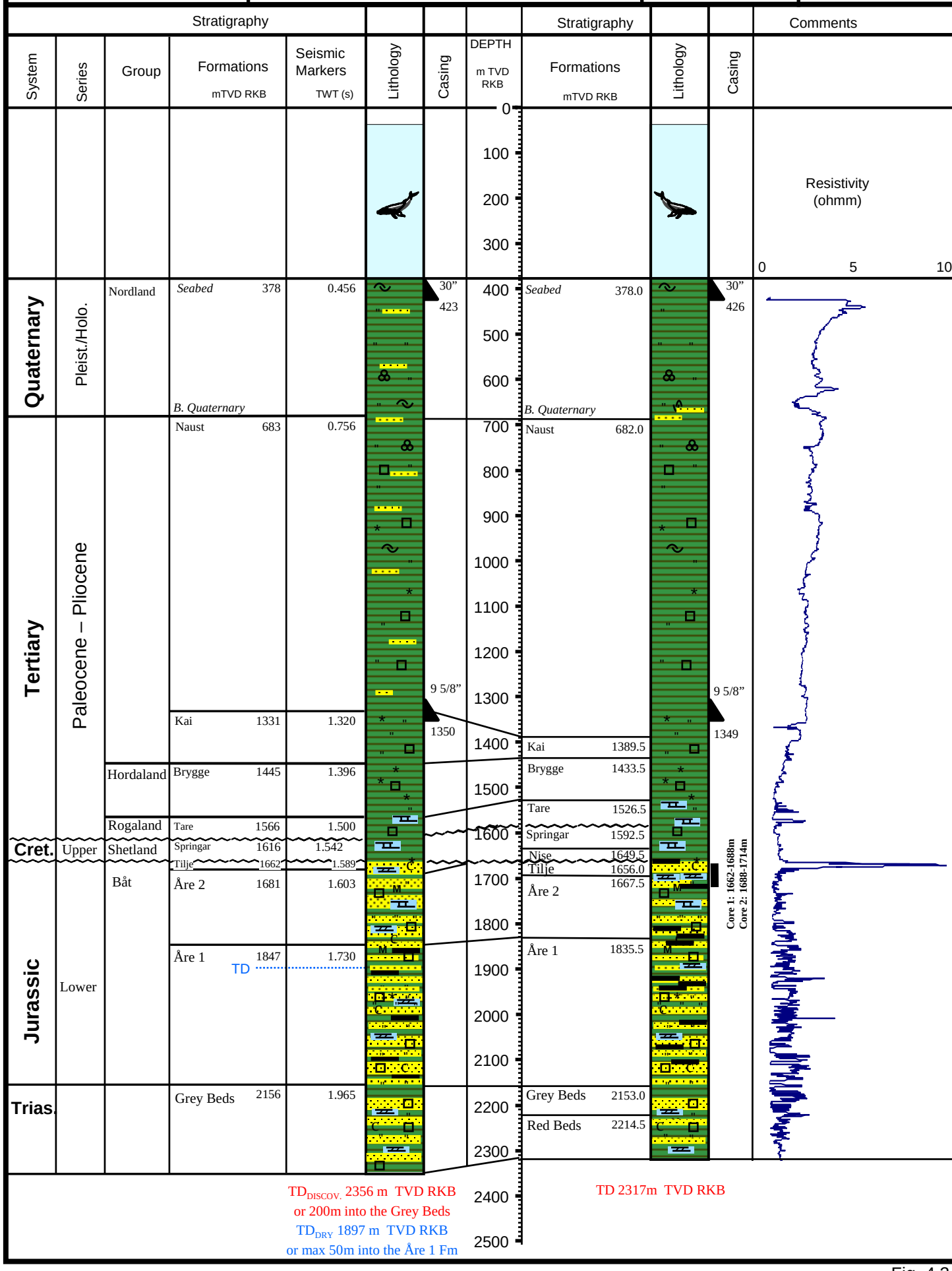


Fig. 4.2

4.5 Hydrocarbon indications

The first returns to surface was when drilling out of 9 5/8" casing shoe at 1349m.
Low gas readings were seen until the top of the reservoir was reached at 1656m. The peak from circulating BU prior to coring was 2.75% (virtually all C1) with a background of 0.15%. (table 4.3). The presents of mainly C1 is in accordance with the experience from the area.
Oil shows were described from the cuttings in the following interval:
1656 – 1662m: even moderately bright to bright yellow to yellowish gold fluorescence on siltstone and sandstone fragments and loose grains, poor to fair bluish white streaming cut fluorescence, poor to fair yellowish white residue fluorescence, non to trace yellowish brown ring residue.
Oil shows were described from sandstones and sandy siltstones in the upper part of core no 1, 1662-1671m, as having a slight hydrocarbon odour, even dull to moderately bright brownish yellow direct fluorescence, poor to fair bluish white streaming cut, fair bluish white solvent cut, good bright white to slightly yellowish white residue fluorescence, and a fair yellowish brown ring residue.
The pressure points and oil sampling confirmed oil in the same interval (corrected to wireline depth).

Minor gas peaks of up to 1.4% over a background gas of 0.1-0.2% were seen below the oil zone. These peaks were related to coal stringers in the Åre Formation. The gas peaks are listed in table 4.3 and illustrated in figure 4.3. The hydrocarbon filled interval is also seen on the resistivity curve, figure 4.2

Depth m RKB	Ggas %	C_1 ppm	C_2 ppm	C_3 ppm	iC_4 ppm	nC_4 ppm	iC_5 ppm	nC_5 ppm	Type	BG %
1360	2.74	25484							Trip gas	0.35
1454	0.84	7570							Formation gas	0.2
1480	0.93	8480							Formation gas	0.15
1662	2.75	12920		9		6		1	Formation gas	0.15
1665	0.84	7904		3	1	2	1	1	Formation gas	0.23
1671	0.66	6131		1		1	1	1	Formation gas	0.2
1765	0.78	6924							Formation gas	0.5
1836	0.65	5284	27	2	1				Formation gas	0.1
1936	0.99	8677							Formation gas	0.3
1958	1.35	11835							Formation gas	0.6
2037	1.37	11703	59	5				1	Formation gas	0.1
2086	0.69	5744	32	3		1	1		Formation gas	0.2

Table 4.3 Gas peaks (FID)

PL 128

RKB - MSL: 36 m

Water Depth: 342 m MSL

Gas readings
Well 6608/11-4, Linerle

North East Segment

STATOIL

Made by: ØH

Date: 15.09.2004

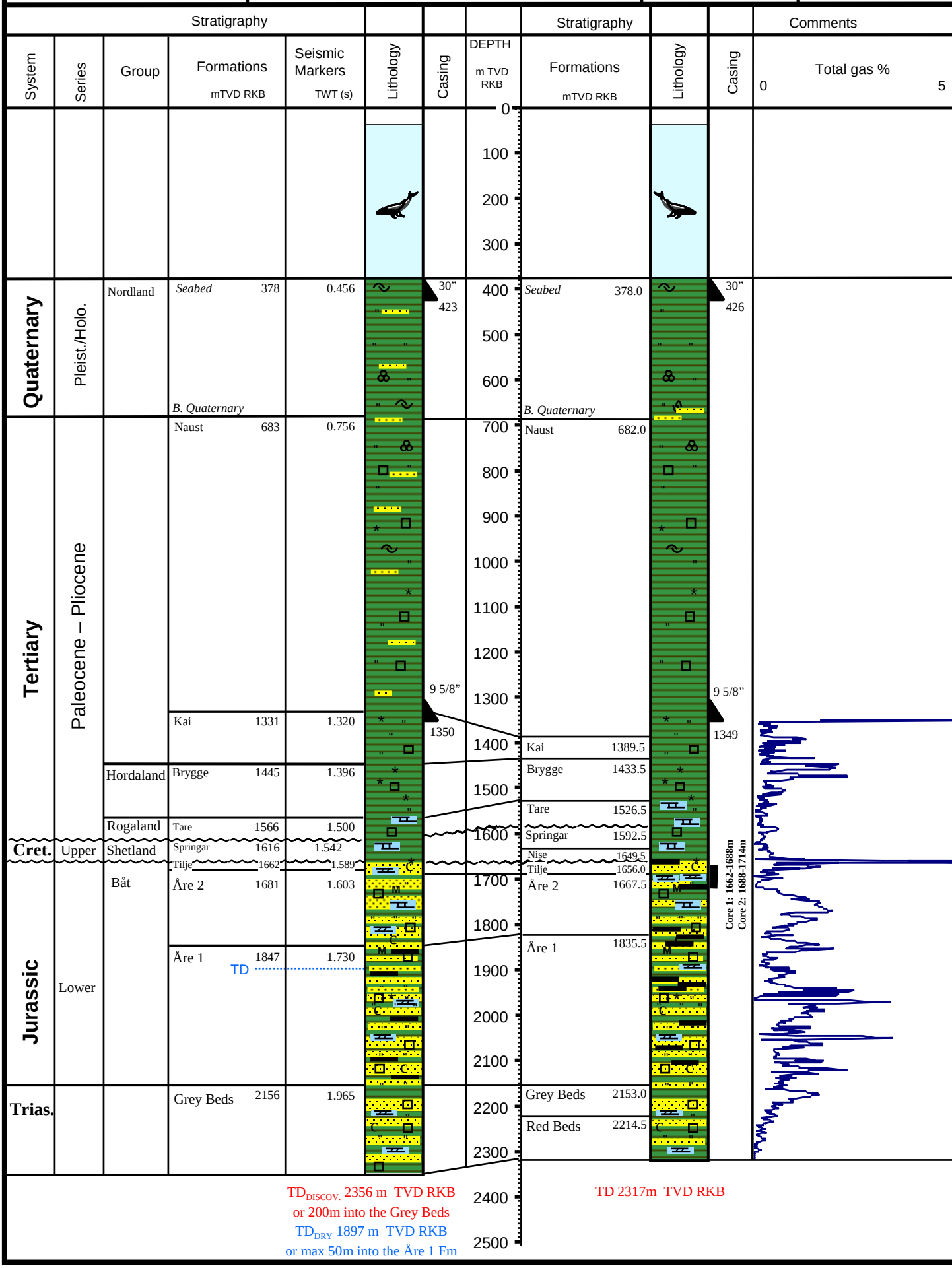


Fig. 4.3

4.6 Geophysical results

The observed formation tops in the well were encountered within the depth uncertainties of the prognosis. The only exemption was the Kai Formation. The difference was caused by an inconsistency of the pick of this formation in the nearby wells, causing a wrong estimate of the interval velocities. The top of the Kai Formation is also difficult to identify in the well with the limited data available (only MWD gr/res logs and no biostratigraphy). The prognosed versus observed formation tops are shown in figure 4.2

4.7 Data acquisition

4.7.1 Cuttings and mud samples

Cuttings were sampled every 10m from 1360 m to 1600 m and mainly every 6m from 1600 m to 2317 m (TD). In this lower part of the well, a sampling interval of 3m was planned. Due to poor quality of the cuttings and high rate of penetration, this was altered to 6m (ref fig. 1.2)
Mud samples were collected every 100 m from 1360 m to TD. In the oil bearing interval several mud samples were taken, both while drilling and when draining the core barrels.
The drilling mud in the well was new. However, when the geochemical analysis was performed, traces of unidentified oil was found in the mud samples. New mud was used in the well.

4.7.2 Conventional coring

Halliburton-Security DBS provided the coring equipment. Fiber glass inner barrels with pressure vents were used.
Res Lab provided the core plug drilling equipment, but due to the very unconsolidated sandstones, no plugs were drilled. Gypsum was used for stabilisation of the core in the inner barrels.

Core no	Cored interval, m	Rec. m	Rec. %	Barrel length m	Barrel util. %	Comment
1	1662 –1688	18.95	72.9	27m	70.4	Fiber glas innerbarrel, stabilised w/gypsum, core jammed
2	1688 -1714	25.28	97.2	27m	93.6	Fiber glas innerbarrel, stabilised w/gypsum, core jammed

Table 4.4

The depth shift of the cores has been done by using the core gamma logs, core lithology (limestone and coal layers) and to some degree por/perm measurements. The table 4.5 shows that the depth shift is not constant.

Core no	Core depth (m)	Depth shifted to wireline (m)	Difference (m)
	1664.7	1664.8	0.2
Core no. 1	1669.8	1670.6	0.8
	1674.3	1674.9	0.6
	1688.1	1688.4	0.3
	1691.5	1691.4	0.0
	1693.0	1692.7	-0.3
	1696.7	1696.1	-0.6
	1698.3	1698.3	0.0
	1699.7	1699.9	0.2
Core no. 2	1702.3	1702.5	0.2
	1704.3	1704.1	-0.2
	1706.0	1706.4	0.5
	1710.1	1710.7	0.6
	1711.9	1712.2	0.3
	1712.0	1712.3	0.3
	1712.3	1713.1	0.8
	1713.3	1714.1	0.8

Table 4.5

When examine the cores in the laboratory by CT scanning, the cored material appeared to be highly fractured (figure 4.3). This has not been observed in cores from the area. The Linerle reservoir is the shallowest in the Norne area and rather unconsolidated.

A scanned section at ca 1663.1m from core 1 and is an example of fractures observed in the cores.

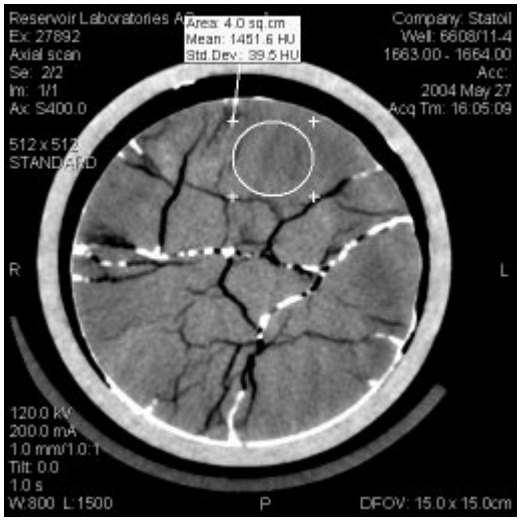


Figure 4.3

4.7.3 MWD/LWD

Run no.	Depth interval m RKB	Collar diam.	Tool	Comment
1	428 - 1357	8¼"	MPR-lite	GR/RES/DIR (PRESS requested while drilling-not planned)
2	1357 - 1662	6¾"	Ontrack RNT	GR/RES/DIR/PRESS
3	1714 - 2317	6¾"	Ontrack RNT	GR/RES/DIR/PRESS

Table 4.6

4.7.4 Wireline logging

Schlumberger performed the wireline logging operation in the 8 ½" open hole section see Table 4.7. The logs are graphically represented in Figure 4.4 and 4.5.

Wireline logging in 8.5" section.

Wireline logging program			
No	**Tool combination**	**Run**	**Interval m MD RKB**
1	PEX-HRLA-ECS-DSI	1A	2318.5 – 1346 m (1346 – 500 m, DSI inside casing)
2	CMR+ - FMI	1A	1725 – 1628 m (CMR, full porosity uplog) 1640 – 2310 m (CMR, BVI mode) 2310 – 1346 m (FMI log)
3	MDT, Pressure points and water sampling	1A	1564.4 – 2247 m (pressure pretest) 1708.5 m (water sampling)
4	MDT, Oil sampling + miniDST	1B	1656.9 – 1657.9 m (Packer depth for Oil sampling + miniDST #1) 1664.7 – 1665.7 m (Packer depth for Oil sampling + miniDST #2)
5	VSP-MSIP-EMS-GPIT	1A	1100 – 1910 m (MSIP downlog) 1850 – 1600 m (MSIP and EMS uplog) 2300 – 1715 m (VSP)
6	MDT, water & oil sampling + miniDST	1C	1772.4 m (Packer depth for water sampling + shut in well for 0.5 hours.) 1677.5 m (Packer depth for water sampling + shut in well for 0.5 hours.) 1680.5 m (Packer depth for water sampling + shut in well for 0.5 hours.) 1663 m (Packer depth for oil sampling + miniDST #3)

Table 4.7

A zero offset VSP was performed. 55 levels were shot from 2272 m to 500 mTVD RKB with a CSI tool. Shot several times at each level due to bad weather condition. The VSP data acquisition was therefore abandoned at 1717 m TVD RKB with only check shots levels and formation tops taken above this depth.

4.7.5 Data quality

The quality of the cuttings was poor from approximately 1650 m to TD of the well.
The claysone/siltstone partly dissolved.
The MWD logging was performed as planned with logs of good quality.
The quality of the data from the wireline logging operation was generally good.
There were taken several samples, both water and oil. Analysis results conclude that there are very little contamination, see chapter 4.9.
There were some problems when logging the VSP due to noise related to bad weather. Due to wind and big waves both the thrusters and some propellers were running which effected the logging operation. Several extra shots had to be taken at each level due to bad weather conditions and therefore the data quality of the VSP log is only satisfactorily.

PL 128

RKB - Sea 36 m

Water depth 342 m MSL

Composite plot
Well 6608/11-4

STATOIL

Made by: Svty

Date:04.10.2004

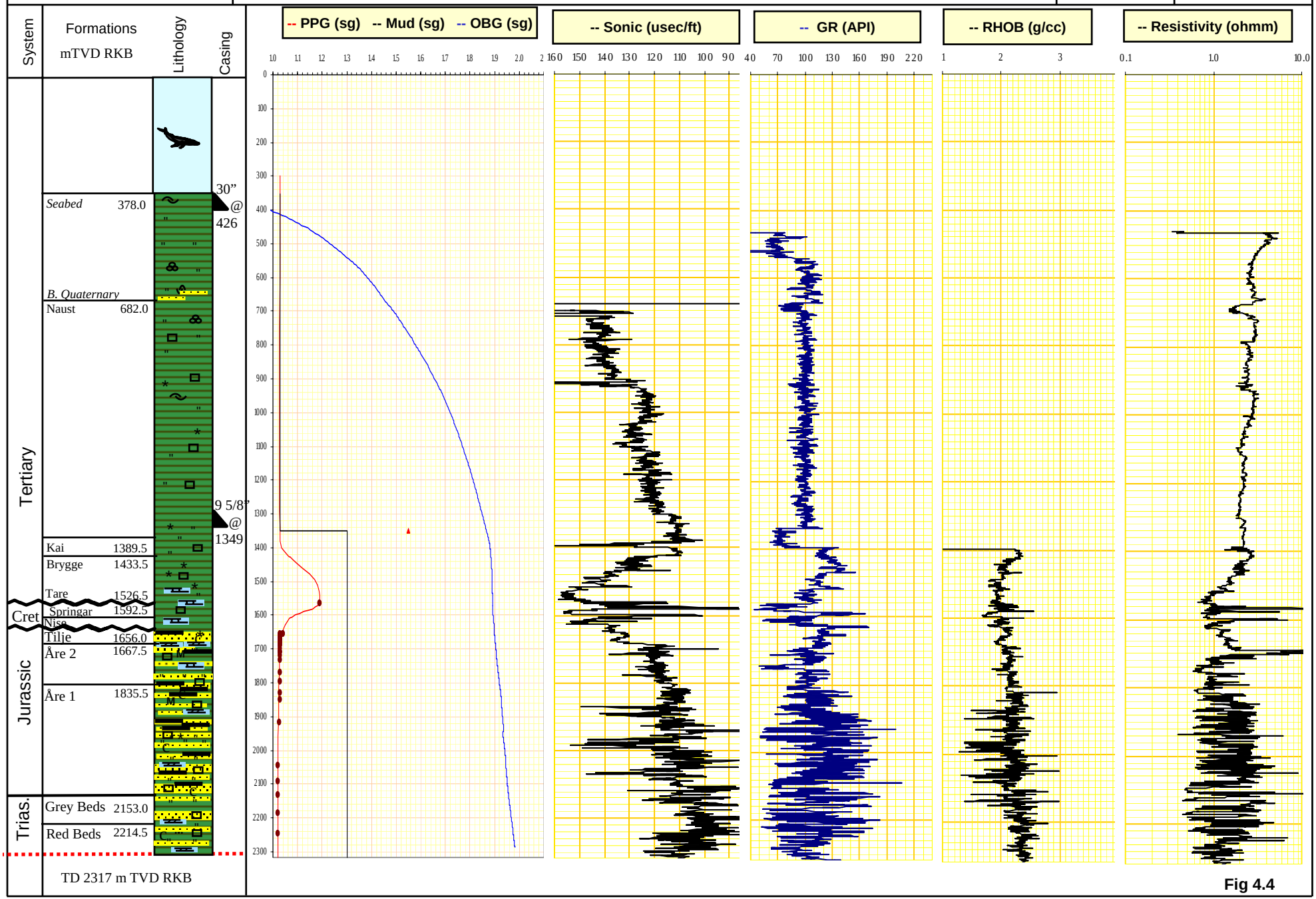


Fig 4.4

PL 128

RKB - Sea 36 m

Water depth 342 m MSL

Composite plot
Well 6608/11-4

STATOIL

Made by: Svty

Date:04.10.2004

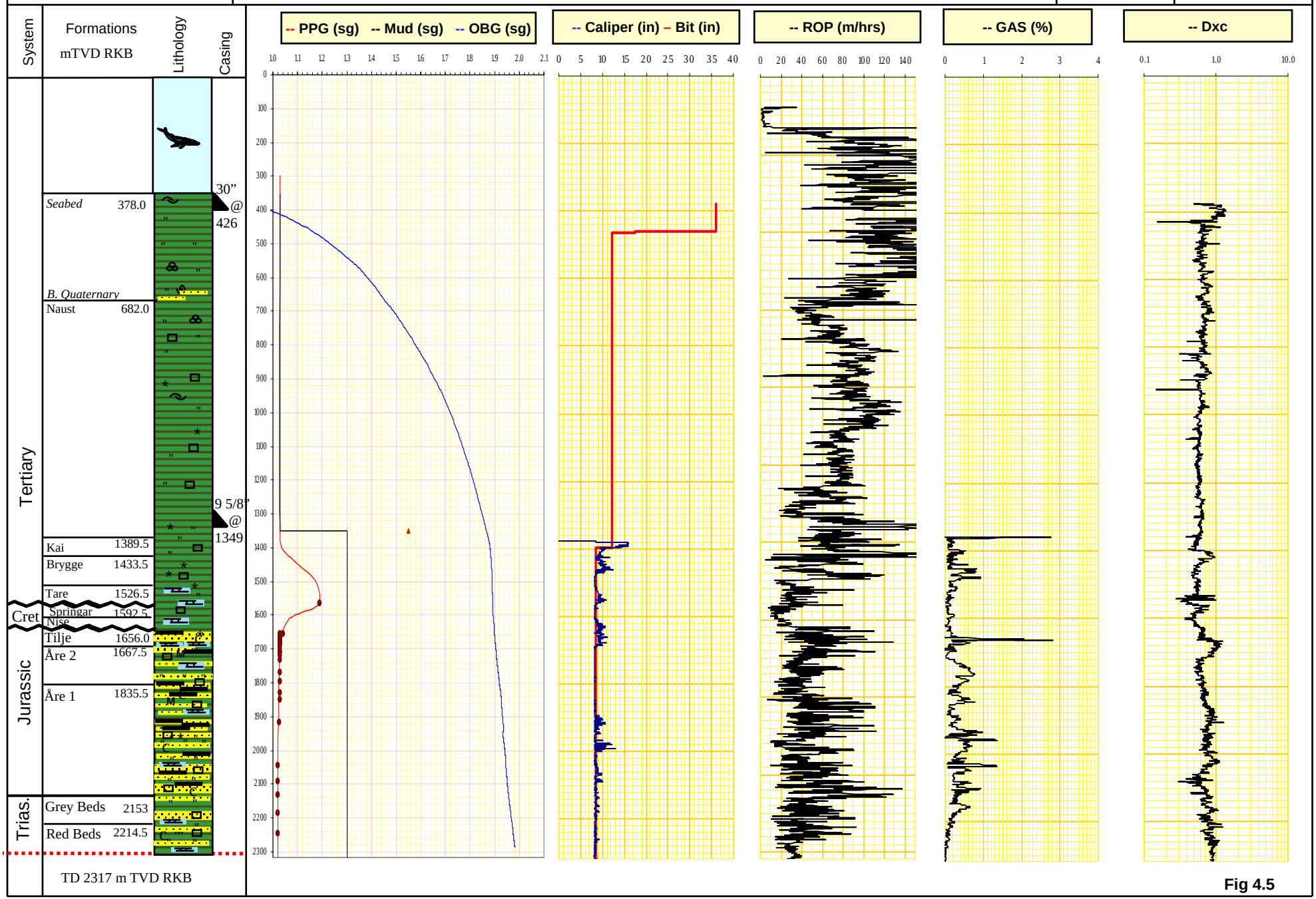


Fig 4.5

4.8 Formation pressure

The pore pressure profile shows a normal trend down to approximately 1400 mTVD RKB were rapid increase starts. The highest pore pressure is reached in the Brygge and Tare Formations, with a maximum gradient of 1.19 g/cm^3 at 1564 mTVD RKB, measured with the MDT tool. Below this point the pore pressure gradient decreases. In top Åre Formation the pore pressure is measured to be 1.04 g/cm^3, which is the max case in the HC filled reservoir. In the water filled reservoir the pore pressure is normal, 1.03 g/cm^3. Several pressure tests have been made with the MDT tool. See Figure 4.8 for more details.

The pore pressure has also been calculated using the sonic, resistivity and the D-exponent in this well using different methods. All of them follow the same trend as the measured pore pressure. The formation pressure in the Brygge and Tare Formations is well known in this area since several wells have been drilled here, and the formation pressure is therefore expected to be the same as the prognosis pressure. The evaluated pore pressure from the resistivity log and the drilling exponent is slightly higher than the predicted pressure from the sonic log. The sonic log gives the lowest pore pressure gradient and the best prediction compared to the measured pressure in the Brygge, Tare and reservoir Formations.

The overburden gradient is calculated using the density log from wireline run 1A from 1350 down to TD. Above the 9 5/8" casing shoe, density data from the wells 6608/11-3 and 6506/12-1 is used, see Figure 4.6.

4.8.1 Reservoir pressure summary

In the first MDT run a total of 41 pretest were taken, 26 good, 10 poor, 4 tight and 1 supercharged. Five miniDST were performed, one in the second MDT run and four in the last MDT run. Three of them were in the oil zone, 1656 mTVD RKB, 1663 mTVD RKB and 1672.5 mTVD RKB, and two of them in water zone 1677.5 mTVD RKB and 1680.5 mTVD RKB respectively. The shut in time for two of the miniDST in the oil zone were four hours and the ones in the water and deepest one in the oil zone only half an hour.
A standard quartz gauge was used in the first miniDST, but the rest of the miniDST were performed with a strain gauge due to failure in the quartz gauge.

The pressure measurements from the pre test were used to define a gradient in the water and oil zone in the Åre2 Formation using linear regression. The oil gradient was calculated to be 0.872 g/cm^3 and the water gradient to be 1.006 g/cm^3. The oil gradient do not match with the measured density from lab, the oil density is measured to be 0,915 g/cm^3, but the water gradient is almost the same as measured in the lab, 1.010 g/cm^3 (1.03 measured in the lab). The reason for this deviation in the oil density will be looked into.

MDT pressure summary, Run 1A, pretests and water sampling

Test no	Forma-tions	Depth m TVDRT	Depth m MSL	Hydro pressure Before (Bar)	Hydro pressure After (Bar)	Formation pressure (Bar)	Mobility (mD/cp)	Temp (^oC)	Gradient g/cm^3	Comments
1	Åre 2	1656.0	1620.0	216.64	216.61	168.63	1.1	#N/A	1.04	Poor permeability
2	Åre 2	1657.0	1621.0	216.73	216.69	167.72	527	#N/A	1.03	Very good
3	Åre 2	1658.0	1622.0	216.81	216.80	167.80	157	47.5	1.03	Good
4	Åre 2	1660.0	1624.0	217.08	217.09	176.38	3.6	#N/A	1.08	Supercharge
5	Åre 2	1661.5	1625.5	217.28	217.22	168.04	278	47.8	1.03	Good
6	Åre 2	1663.0	1627.0	217.42	217.84	168.18	137	48.2	1.03	Good
7	Åre 2	1666.0	1630.0	217.84	217.85	168.45	50.1	48.4	1.03	Good
8	Åre 2	1669.0	1633.0	218.18	218.66	168.82	11.2	48.5	1.03	Fair
9	Åre 2	1670.4	1634.4	218.36	218.33	168.85	6	48.8	1.03	Good – not 100% stable
10	Åre 2	1671.0	1635.0	218.47	218.45	169.08	0.6	48.9	1.03	Poor – repeated tests 3 times
11	Åre 2	1672.4	1636.4	218.61	218.58	169.02	9.4	49.4	1.03	Good
12	Åre 2	1673.5	1637.5	218.77	218.77	#N/A	0.8	#N/A	#N/A	Tight
13	Åre 2	1677.0	1641.0	219.23	219.68	169.31	26.1	49.8	1.03	Good
14	Åre 2	1682.0	1646.0	219.91	219.88	169.74	86.5	50.1	1.03	Good
15	Åre 2	1688.5	1652.5	220.78	220.71	170.37	303	50.4	1.03	Very good
16	Åre 2	1698.6	1662.6	222.05	222.05	171.35	207.6	50.8	1.03	Very good
17	Åre 2	1708.5	1672.5	223.35	223.28	172.33	1633	51.3	1.03	Very good
18	Åre 2	1718.0	1682.0	224.53	224.52	173.29	920	51.4	1.03	Very good
19	Åre 2	1734.0	1698.0	226.66	226.58	175.00	33.2	52.6	1.03	Good
20	Åre 2	1770.0	1734.0	231.26	231.18	178.44	305	53.2	1.03	Very good
21	Åre 2	1796.0	1760.0	234.61	234.52	181.05	1060	53.8	1.03	Very good
22	Åre 1	1812.5	1776.5	236.76	236.74	167.27	0.1	#N/A	0.94	Tight
23	Åre 1	1819.5	1783.5	237.65	237.66	134.23	0.3	#N/A	0.75	Tight
24	Åre 1	1830.0	1794.0	239.04	238.94	184.45	637	#N/A	1.03	Very good
25	Åre 1	1851.5	1815.5	241.86	241.72	186.54	1170	#N/A	1.03	Very good
26	Åre 1	1918.0	1882.0	251.26	250.34	193.12	1840	52.1	1.03	Very good
27	Åre 1	1997.0	1961.0	260.60	260.51	200.82	1589	#N/A	1.03	Very good
28	Åre 1	2045.0	2009.0	266.72	266.70	205.50	1084	#N/A	1.02	Very good
29	Åre 1	2091.0	2055.0	272.67	272.60	210.07	2621	63.6	1.02	Very good
30	Åre 1	2132.5	2096.5	278.00	277.94	214.06	965	64.7	1.02	Very good
31	Åre 1	2185.4	2149.4	284.76	284.68	219.44	29.5	65.5	1.02	Good
32	Åre 1	2247.0	2211.0	297.77	292.66	225.77	34.8	#N/A	1.02	Good

Sampling										
33	Åre 2	1680.5	1644.5	219.57	#N/A	169.49	13.5	#N/A	1.03	
34	Åre 2	1680.0	1644.0	219.50	219.47	156.81	2.4	#N/A	0.95	Aborted to poor permeability
35	Åre 2	1681.0	1645.0	219.63	#N/A	169.62	41.2	#N/A	1.03	Aborted
36	Åre 2	1682.5	1646.5	219.85	219.81	169.70	46.6	#N/A	1.03	Aborted
37	Åre 2	1688.5	1652.5	220.60	#N/A	170.31	#N/A	#N/A	1.03	Aborted to poor permeability
38	Åre 2	1688.4	1652.4	220.65	#N/A	170.32	#N/A	53.8	1.03	Aborted to poor permeability

Pretest after sampling										
39	Åre 2	1708.5	1672.5	223.24	#N/A	172.24	602.4	52.6	1.03	Sample pretest
40	Åre 2	1708.5	1672.5	223.24	222.97	172.31	602.4	52.6	1.03	Sample pretest
41	Åre 2	1672.4	1636.4	220.60	#N/A	168.991	13.3	50.2	1.03	Sample pretest, lost seal
42	Åre 2	1672.7	1636.7	218.41	#N/A	169.021	7.6	50.2	1.03	Sample pretest, pump motor stalling
43	Åre 2	1672.6	1636.6	218.38	218.39	169.765	8.2	50.7	1.03	Sample pretest, tool plugged.
44	Naust	1339	1303.0	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Pretest inside csg to check if the tool after flushing the tool string.
45	Tang	1564.4	1528.4	209.55	#N/A	#N/A	#N/A	#N/A	#N/A	Aborted, slow form. pressure buildup.
46	Tang	1564.4	1528.4	206.69	204.71	#N/A	0.5	45.7	1.19	Poor, unstable test
47	Tang	1566.5	1530.5	205.02	205.05	#N/A	#N/A	#N/A	1.15	Tight, volumetric limited method

Table 4.8

MDT pressure summary, Run 1B, oil sampling and miniDST with dual packer.

Test no	Forma-tions	Depth m TVDRT	Depth m MSL	Hydro pressure Before (Bar)	Hydro pressure After (Bar)	Formation pressure (Bar)	Mobility (mD/cp)	Temp (°C)	Gradient g/cm^3	Comments
48	Åre 2	1656.1	1620.1	216.55	216.428	#N/A	1.1	48.4	#N/A	Pretest to check if there is mobility at the probe
49	Åre 2	1656.0	1620.0	216.39	216.428	#N/A	527	48.5	#N/A	Pretest to check if there is mobility at the probe
50	Åre 2	1656.2	1620.2	216.48	#N/A	#N/A	157	#N/A	0.00	
51	Åre 2	1656.3	1620.3	#N/A	#N/A	#N/A	3.6	#N/A	0.00	
52	Åre 2	1657.6	1621.6	#N/A	#N/A	167.60	278	#N/A	1.03	Pretest with packer module, miniDST#1
53	Åre 2	1655.6	1619.6	216.43	#N/A	168.16	137	#N/A	1.04	Pretest at probe, miniDST#1
54	Åre 2	1664.7	1628.7	217.32	#N/A	168.33	50.1	#N/A	1.03	Pretest at probe, miniDST#2
55	Åre 2	1666.7	1630.7	210.61	#N/A	#N/A	11.2	#N/A	#N/A	Pretest with packer module, miniDST#2. Aborted, pressure building up too high
56	Åre 2	1666.7	1630.7	210.61	#N/A	168.33	6	#N/A	1.03	Pretest with packer module, miniDST#2.

Table 4.9

MDT pressure summary, Run 1C, oil + water sampling and miniDST with dual packer.

Test no	Forma-tions	Depth m TVDRT	Depth m MSL	Hydro pressure Before (Bar)	Hydro pressure After (Bar)	Formation pressure (Bar)	Mobility (mD/cp)	Temp (°C)	Gradient g/cm^3	Comments
57	Åre 2	1670.4	1634.4	217.77	#N/A	168.75	#N/A	42.1	1.03	Probe pre-test before sampling at 1672.4m
58	Åre 2	1672.4	1636.4	218.13	#N/A	169.41	#N/A	41.1	1.03	Packer pre-test before sampling at 1672.4m
59	Åre 2	1675.5	1639.5	218.67	#N/A	174.82	#N/A	#N/A	1.06	Probe pre-test before sampling at 1677.5 m
60	Åre 2	1678.5	1642.5	218.84	#N/A	169.35	#N/A	47.9	1.03	Probe pre-test before sampling at 1680.5m
61	Åre 2	1680.5	1644.5	#N/A	#N/A	#N/A	#N/A	#N/A	#N/A	Pre-test with packer not done
62	Åre 2	1661.0	1625	218.76	#N/A	167.91	#N/A	48.7	1.03	Probe pre-test before sampling at 1661m
63	Åre 2	1663.0	1627	220.72	#N/A	168.7	#N/A	48.7	1.03	Packer pre-test before sampling at 1663m
64	Åre 2	1652.0	1616	215.16	215.09	#N/A	#N/A	#N/A	#N/A	Pre-test in top of reservoir - tight
65	Åre 2	1566.5	1530.5	203.99	#N/A	175.97	9.3	40.8	1.15	Recycle 3 hrs.

Table 4.10

4.9 Reservoir fluid sampling

Oil samples were collected in Åre2 formation using a dual packer. Even though some technical problems occurred during sampling with the MDT tool, the samples were of good quality.

Samples collected from Run 1A 6608/11-4

Sample depth (m MD)	Run No	*Bottle Number	Chamber (volume)	Drawdown (bar)	Formation Pressure (bar)	Pump Volume	Mobility (mD/CP)	Opening pressure (bar)	Transferred to
1708.5	1A	MRSC#200	1 gal	4	172.2	269	602	121	Jerry Can
1708.5	1A	MPSR1-073	450 cc	4	172.2	279	602	110	50188 (Xample)
1708.5	1A	MPSR2-970	450 cc	4	172.2	286	602	124	TS-23407 (Proserv)
1708.5	1A	MPSR3-694	450 cc	4	172.2	291	602	124	TS-47507 (Proserv)

Table 4.11

Samples collected from Run 1B 6608/11-4

Sample depth (m MD)	Run No	*Bottle Number	Chamber (volume)	Drawdown (bar)	Formation Pressure (bar)	Pump Volume	Mobility (mD/CP)	Opening pressure (bar)	Transferred to
1657.6	1B	MRSC#68	18 gal	9.2	167.75	229	300 [1]	29	Jerry Can
1657.6	1B	MPSC#115	2 ¾ G	9.0	167.75	238	300 [1]	34	50188 (Xample)
1657.6	1B	MPSC#113	2 ¾ G	9.3	167.75	258	300 [1]	45	TS-23407 (Proserv) TS-28513 (Proserv) TS-36002 (Proserv) Plastic bottle 50473 (Xample)
1657.6	1B	MPSC#189	1 G	9.0	167.75	270	300 [1]	35	TS-47507 (Proserv)
1657.6	1B	MPSR#644	450 cc	9.2	167.75	290	300 [1]		Not filled
1657.6	1B	MPSR#147	450 cc	9.2	167.75	293	300 [1]		Not filled

[1] Mobility is from pretest run

Table 4.12

Samples collected from Run 1C 6608/11-4

Sample depth (m MD)	Run No	*Bottle Number	Chamber (volume)	Drawdown (bar)	Formation Pressure (bar)	Pump Volume	Mobility (mD/CP)	Opening pressure (bar)	Transferred to
1672.4	1C	MRSC#154	1 gal	4.7	169.0	68			TS-52102 (Proserv)
1677.5	1C	MPSR#610	450 cc	4	169.4	103			TS-12418 (Proserv)
1677.5	1C	MPSR#696	450 cc	4	169.4	103			TS-4055 (Proserv)
1680.5	1C	MPSC#172	1 G	2.6	168.7	107			Plastic & Glass bottles
1663	1C	MRSC#68	18 G	4.5	168.2	103			Jerry Can
1663	1C	MRSC#170	1 G	4.8	168.2	201			TS-52101 (Proserv)
1663	1C	MPSR#970	450 cc	4.8	168.2	212			TS-36003 (Proserv)
1663	1C	MPSR#694	450 cc	4.8	168.2	220			TS-54103 (Proserv)
1663	1C	MPSR#073	450 cc	4.8	168.2	224			TS-29201 (Proserv)
1663	1C	MPSR#1006	450 cc	4.8	168.2	229			TS-36303 (Proserv)

Table 4.13

The oil samples contained very little formation water and mud, except for the 18 Gallon chambers.

The water samples were very little contaminated regarding use of water-based mud, except for formation water from the 18 Gallon oil samples.

The water samples from 1708.5 m had very little contamination (0.23%). The water samples from 1677.5 and 1680.5 mTVD RKB contained 16 and 24% contamination respectively from the mud measured from the Tritium level in the mud. Analysis on the formation water from the 18 Gallon samples where highly contaminated as expected, above 50%.

PL 128

RKB - MSL: 36 m

Water Depth: 342 m MSL

Final pore pressure
Well 660811-4
Linerle

STATOIL

Made by: ØH-Svty

Date: 04.10.2004

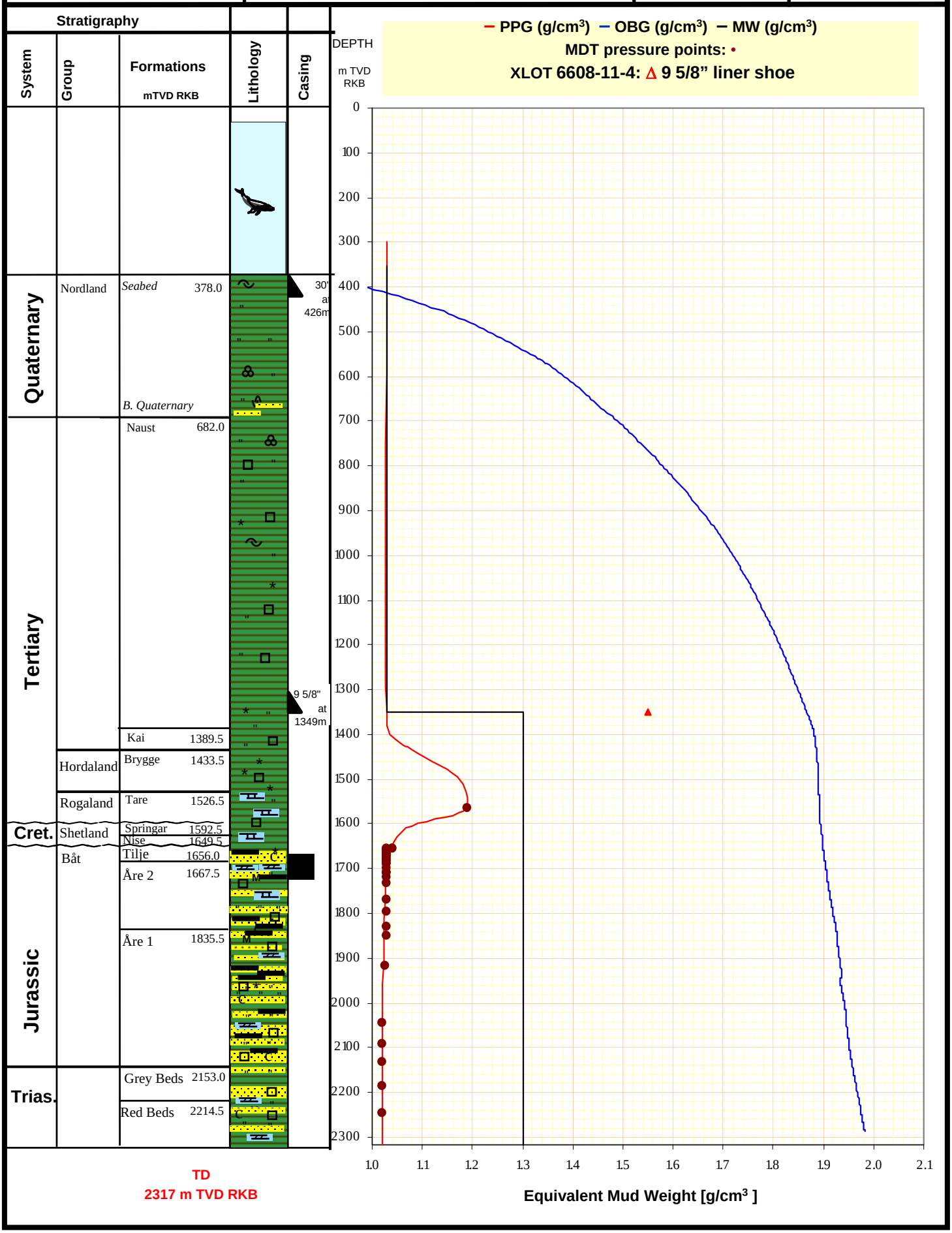


Fig. 4.6

PL 128

RKB - MSL: 36 m

Water Depth: 342 m MSL

Temperature gradient
Well 660811-4
Linerle

STATOIL

Made by: ØH-Svty

Date: 04.10.2004

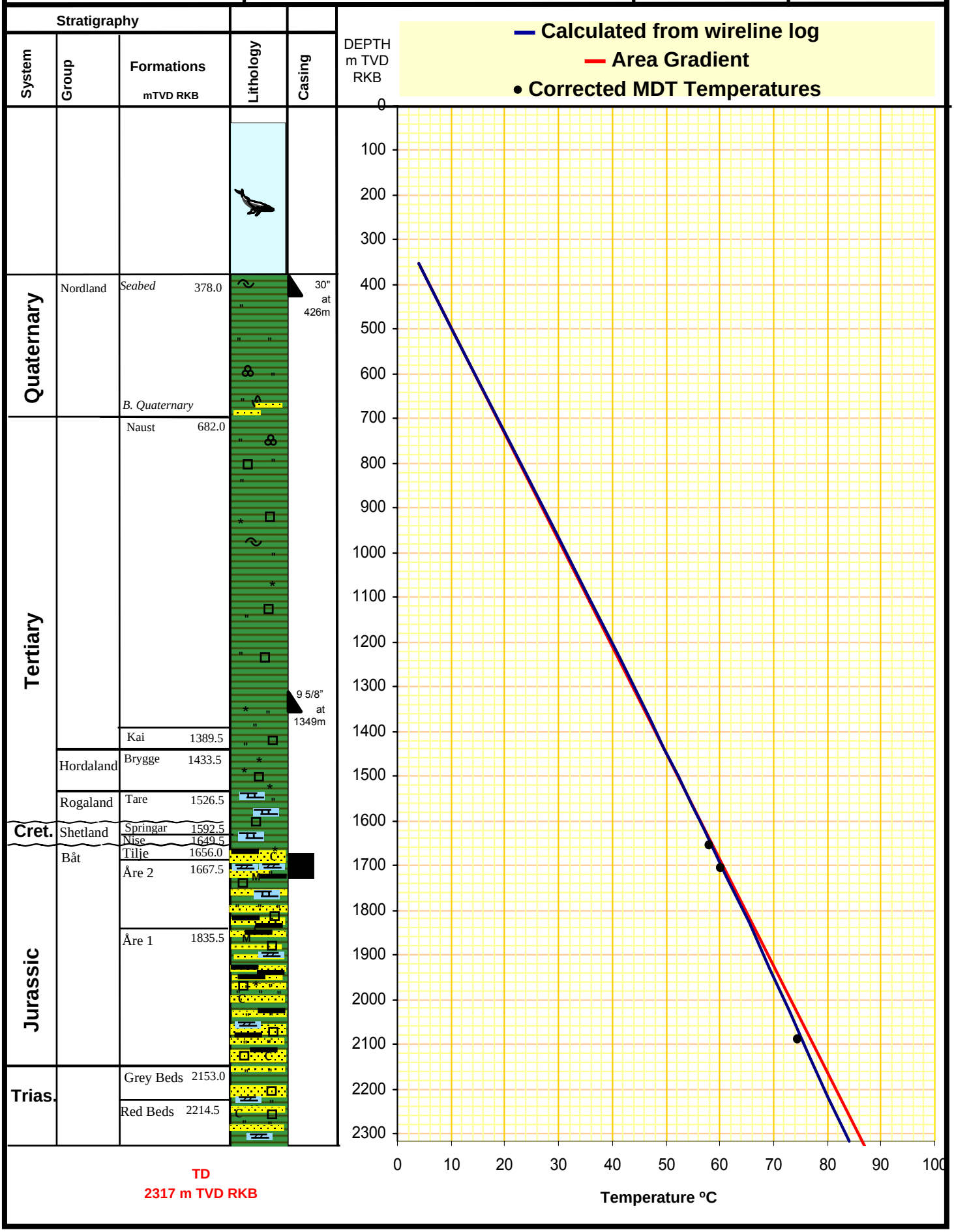


Fig. 4.7

PL 128	Gradient plot Well 6608/11-4	STATOIL	
RKB - Sea 36 m		Made by: Svty	Date: 27.08.2004
Water depth 342 m MSL			

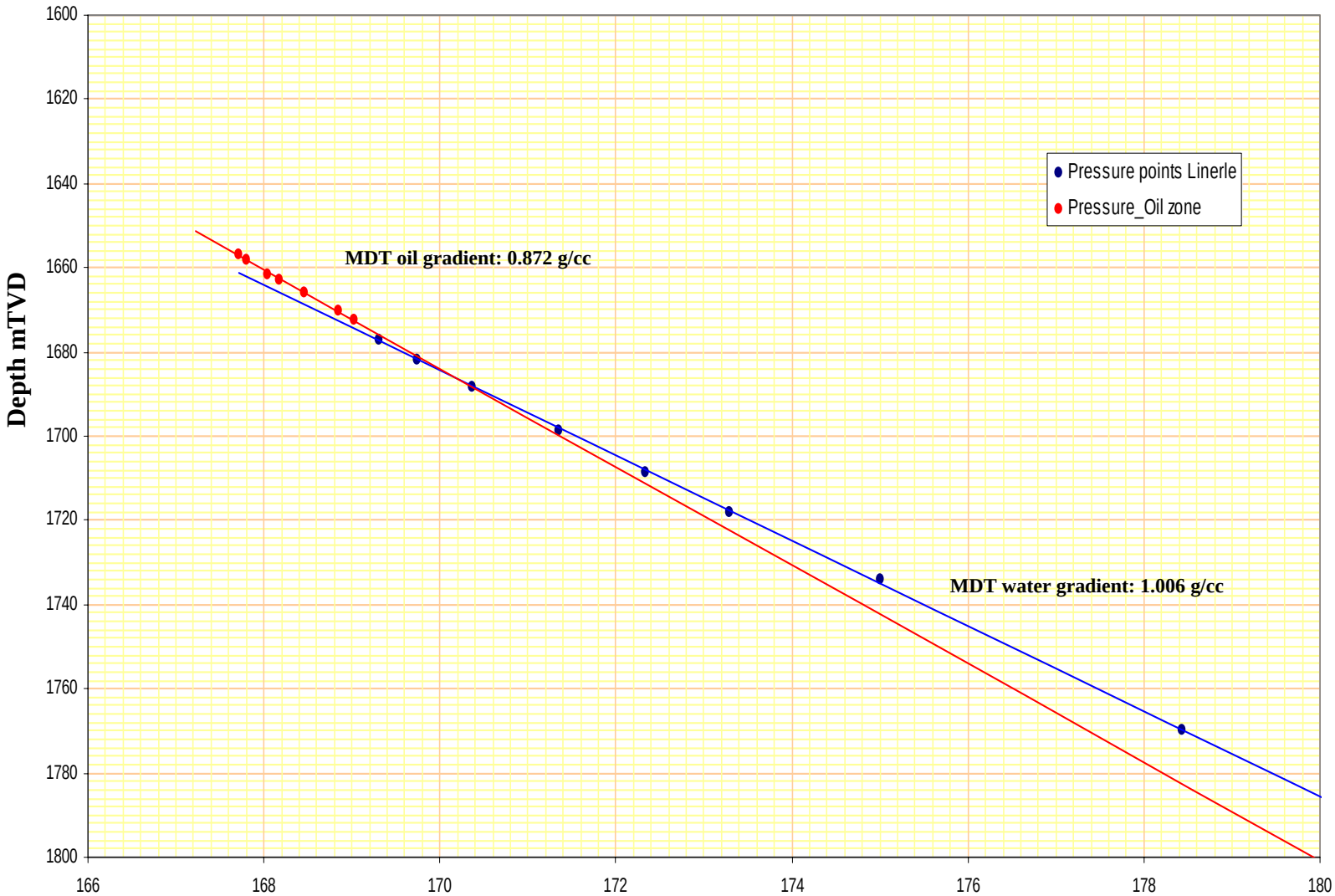


Fig 4. 8

4.10 Leak off test

One extended leak off test (XLOT) was performed below with one cycle below the 9 5/8" casing shoe. Between the first and the second cycle a LCM pill was added. No effect of the pill was seen or measured on the initiating- or the reopening-pressure. See Table 4.2
The XLOT was a good test with a mud weight of 1.03 g/cm^3. The XLOT value is measured to be 1.55 g/cm^3 at 1349 mTVD RKB. The two cycles in the extended leak off test is plotted in Figure 4.9, the XLOT value is plotted in table 4.14.

Pressure in different periods of the XLOT.

	First cycle		Second cycle	
	Bar	**g/cm3**	**Bar**	**g/cm3**
FIP (Fracture Initiating Pressure)	212	1.60		
FPP (Fracture Propagation Pressure)	206	1.56	201	1.52
FCP (Fracture Closure Pressure)	193	1.46	171-181*	1.29-1.37*
FRP (Fracture Reopening Pressure)	205	1.55		

* The closure pressure in the second cycle is more difficult to measure it is interpolated to be between 171 and 181 bar (1.29-1.37 g/cm3 EMW).
Table 4.14

The XLOT value

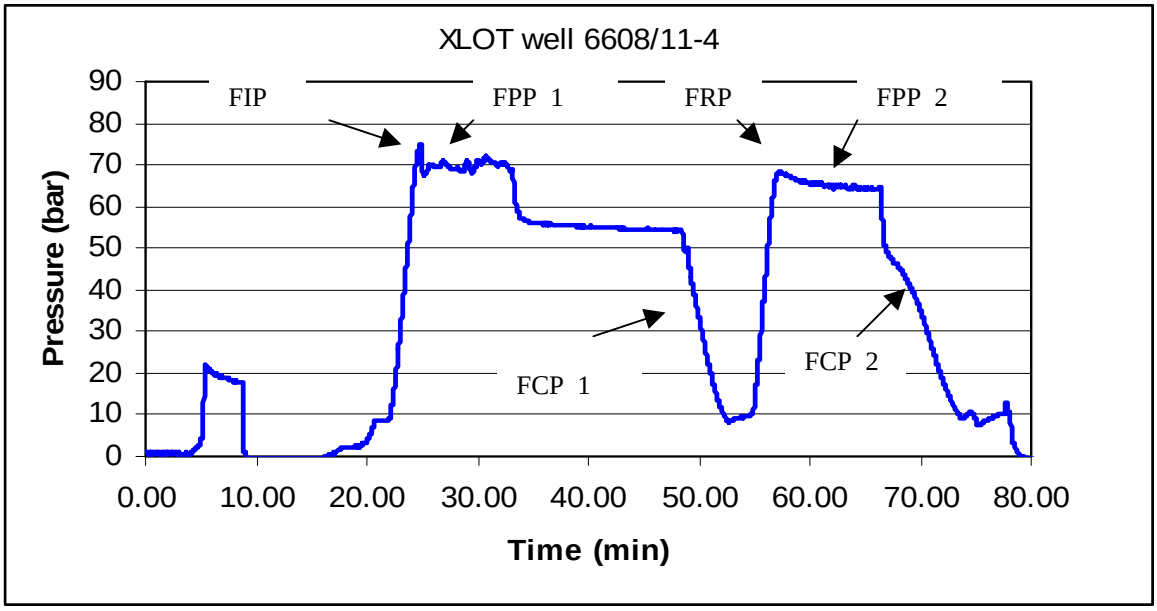


Figure 4.9

4.11 Formation temperature

The evaluated temperature is calculated by using an in-house (Hermansrud, 1999) equation that takes into consideration the time since circulation and the measured temperature from the logging tool.

$$VRT = T_f + 75 \cdot EXP\left(\frac{-t}{8}\right)^{0.5} \qquad t < 50 \text{ hours}$$

VRT: Virgin Rock Temperature
T_f: Measured Formation Temperature
t: Time since circulation

Temperature measurements are available from all wireline run in the 8.5" section, that follows a gradient of 4.2°C/100 m down to top reservoir.
From top reservoir and down to TD, the temperature decreases with a lower gradient, approximately 3.8°C/100 m.

See Figure 4.7 for the temperature profile.

Measured and evaluated temperatures

Tool combination	Depth of measurement m TVD RT	Recorded max temperature ^{0}C	Time since last circulation hrs	Evaluated temperature ^{0}C
PEX-HRLA-ECS-DSI	2317	62	11.9	84.1
FMI-CMR	2317	70	24.6	83.0
VSP	2317	72	125	-

Table 4.15

5 Drilling operations report

5.1 Rig move and positioning

The drill ship West Navigator sailed to the Linerle location after completing the Alve exploration well (6507/3-4) for Statoil. The ship sailed the 17 Nm with an average reduced speed of 1.4 kph. The ship sailed with the reduced speed because the the BOP and riser was pulled in the Main rig while in transit.

5.2 32" section

5.2.1 Summary

As a part of pre-qualifying potential drilling methods and equipment prior to the Barents sea campaign, where zero discharge is a focal point, the Linerle well was identified as a candidate to test the Preconduct concept for the top hole.
This is a system where the conductor (32") is hammered down to a required depth with a hydraulic hammer, i.e. no discharge of cuttings to seabed.
As this was only the second time this equipment was run from a floater worldwide, a full package of conventional equipment was mobilized and sent to the rig at the same time.

After the Preconduct equipment were lifted onboard (incl. a 23 ton and 23 m long conductor and a hydraulic hammer section of 16 ton) and rigged up, the 32" conductor joint with the hydraulic hammer section inside was run down to seabed.
All weight was then set down, and the conductor self-penetrated approx. 3 m before it stopped.
The conductor was then hammered down 2 more meters, when it was necessary to abort the operation due to too high inclination. Several attempts were made to pull the conductor free with max. 20 ton over pull, and at the same time the ship was moved in several directions.

A reduction in the inclination was then obtained, and the hammering operation was resumed. After the conductor was hammered 1 m deeper, no further progress was obtained after 5 hrs of hammering at the same depth. It was then decided to abort the hammer operation and pull the conductor and hammer section to surface.
At this stage it was not possible to pull the conductor free or releasing the hammer assembly from the conductor.

After washing and drilling around the conductor with a 17 ½" bit ran on drill pipe from the Auxillary rig, the conductor finally came free with 35 ton over pull. It was pulled to surface and the Preconduct operation was aborted and all the surface equipment was rigged down.

5.3 36” section

5.3.1 Summary

When the Preconduct operation was aborted in the Main rig, a standard 36” BHA (17 ½” bit, 26” x 36” Red Baron Heavy-Duty HO, Anderdrift and 9 ½” DC) was run from the Auxillary rig.
One attempt was made to spud the well in the same hole as the conductor was hammered, but also with the drilling BHA no progress were achieved at the depth where the conductor stopped.

The well was then respudded 10 m to the East.
Very hard drilling with low progress (1-2 m/hr) was experienced down to approx. 420 m, where a drilling break was experienced. The last 6 m were soft and easy drillable. The hole was displaced to 1.35 SG bentonite mud prior to running conductor.

4 joints of 30” conductor was run from the Auxiliary rig and landed off at the 26” hole shoulder.
2 hrs were used to stab in the 30” conductor into the hole due to poor visibility at sea bed with the ROV.

The conductor was then cemented on bottom using 1.56 SG X-lite cement slurry, and the running tool was released from the conductor without waiting on cement.

5.3.2 Experiences / Recommendations

36” BHA

A Red Baron Heavy-Duty 26” x 36” HO with inserts was used in combination with a 17 ½” mill-tooth bit. As a precaution to avoid angle build-up, the top hole was drilled with very low progress and only 0-2 t WOB. Minor wear was present at the cutter structure on the bit and the HO, but the body of the HO and the shanks for the rollers were severely worn and ringed out.
Recommendation : Evaluate if insert cutters is necessary in future wells in the area. Mill tooth structure should be strong enough with this low WOB and drills boulders more effective then inserts.

5.4 12 ¼" section

5.4.1 Summary

A 12 ¼" pendulum BHA with a mill-tooth bit was made up and run down to sea bed from the Auxiliary rig, while the conductor was run and cemented from the Main rig.

The 12 ¼" section was drilled directly out of the 30" shoe track and down to 1357 m with an average ROP of 81 m/hr (28 % higher ROP then best offset well).

The hole was displaced to 1.30 SG mud prior to POOH. Tight spots of 10-15 ton were experienced from approx. 1250 m, and the BHA was pumped out of hole into the 30" conductor. A wiper trip was then performed to TD, but the hole was in excellent condition and the BHA was pulled out of hole without any resistance.

The 9 5/8" casing was made up in doubles and racked back during the wireline operations of the Alve well.
The 18 ¾" WH housing was crossed over to 9 5/8" casing 9 m below the WH.

No tight spots were observed while running in hole with the 9 5/8" casing down to 1349 m.
The casing was cemented to surface, and full returns were verified with the ROV at seabed.

5.4.2 Experiences / Recommendations

12 ¼" hole drilled out of 30" conductor
The 12 ¼" hole was drilled directly out of the 30" conductor, without drilling out shoe track and rat hole with a larger OD bit first.
No problems were experienced while running in/out with 12 ¼" BHA or while running the 9 5/8" casing.
The shoe track was drilled out in 1 m steps and reamed properly prior to drilling ahead.

12 ¼" Mill-tooth bit and ROP
The 929 m long section was drilled with a Security EBXSC1S (1-1-7W) mill-tooth bit with an average of 81 m/hr. This is approx. 28% faster then the best offset well. The bit was graded 2-2-NO-A-E-I-NO-TD.

Wiper trip
Due to some tight spots of 10-15 ton, the BHA was pumped out of hole and into the 30" shoe. It was then decided to RIH again and perform a wiper trip to TD. No more resistance was observed neither when running in hole or POOH after the wiper trip. 7.5 hrs were used on the wiper trip.

Recommendation : Based on experiences from the previous offset wells, it has been a best practice to not perform a wiper trip, as some drag (10-15 ton) is “normal” when pulling out of hole. No hole problems while running casing has been experienced in the area.

5.5 8 ½" section

5.5.1 Summary

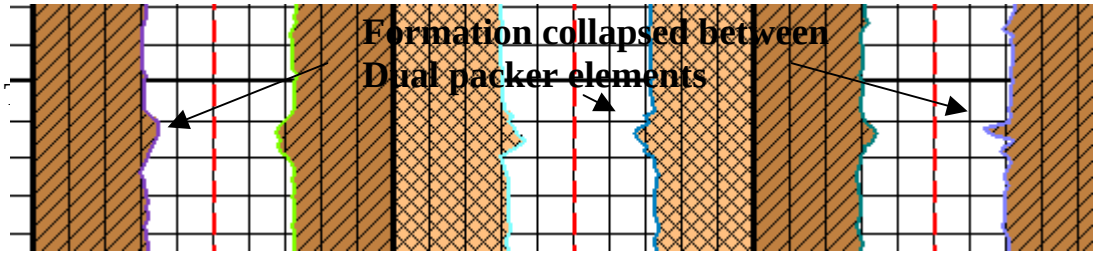
The shoe track and 3 m of new formation was drilled out and cleaned using seawater and hivis pills. A LCM pill was then placed in open hole prior to performing an XLOT equivalent to 1.55 SG.
The well was then displaced to 1.30 SG Glydrill WBM prior drilling down to top reservoir at 1660 m.
Two cores were cut from 1662 – 1714 m.
Due to the HC discovery, the well was drilled to the extended TD at 2317 m (200 m into Grey beds).
Attempted to pull and pump out of hole, but increased drag made it necessary to back ream out of hole and into the 9 5/8" csg shoe. Run in hole again, and worked a few tight spots and pulled out of hole without any further problems.

The reservoir was then logged with a total of 6 wireline runs.
The MDT (mini-DST) was stuck once and was fished by using the cut and thread method.

5.5.2 Experiences / Recommendations

8 ½" bit and ROP
The section down to core point (300 m) and after the coring down to TD (642 m) was drilled with a Security FS2565E PDC bit with a total average ROP of 38 m/hr. This is the highest ROP that is achieved in the area, and the bit has also performed very well in two offset wells. No indications of bit ballling were observed.

"Unexpected" high ECD values experienced
While drilling the section with 2500 LPM, the MWD ECD values gradually increased from 1.44 SG to 1.54 SG towards TD, at times peaking up to 1.57 SG.
800 m of 5" DP was used in open hole, the rest of the string consisted of 5 ½" DP.
Theoretical values: Mudcalc (Statoil's in-house hydraulic program) calculated 1.41-1.43 SG, mud supplier's (MI) more advanced program calculated an ECD of 1.46-1.48 SG.
Wiper trip after stuck MDT WL tool
After the MDT tool was fished, a WL run including a 6-armed caliper was run.
The caliper clearly showed a reduced diameter to 6.25" over the interval between the packer elements on the MDT at the depth were a mini-DST was performed and the tool went stuck.



Due to an OD of 7” on the Dual packer, a wiper trip was performed down to 1750 m prior to the last MDT WL run.

5.6 Permanent plug and abondment

The entire open hole was plugged back with 3 gas-tight balanced cmt plugs and a 4th cmt plug was placed in the transition zone from 8 ½" hole and 100 m into the 9 5/8" casing.
The cement plug was pressure tested to 70 bar above XLOT at 9 5/8" csg shoe (110 Bar).

A 9 5/8" EZSV w/ hydraulic RT was run in combination with a BOP test plug in the same string. No indications of releasing the WB were observed, but the EZSV was set at 620 m.
The EZSV was pressure tested to 110 bar (a clear difference in test volume compared to the cmt plug stated the plug was holding) and the well was displaced to seawater.
The WB was not attached to the BOP plug test tool, and a separate run was made to retrieve the WB.

The BOP was then unlatched and pulled to surface from the main rig.
Meanwhile a 200 m surface cmt plug was placed on top of the 9 5/8" EZSV and the 20" x 30" WH was cut 4 m below the sea bed using the Aux rig.

5.6.1 Experiences / recommendations

20" Housing jnt length
To fulfill all requirements regarding cutting of the surface casing min. 5 m below sea bed, the design of the 18 ¾" x 9 5/8" Housing joint must be optimized. To avoid conflict between the MOST cutting tool and the 9 5/8" X/O (tool OD = 12"), the surface casing was cut 4 m below seabed. An exemption against WR0436 was written and approved (ref. Synergi no. 263454).

Recommendation : The 20" interval on the Housing joint must be long enough to take care of the requirement of cutting 5 m below seabed.

5.7 Figures and tables

5.7.1 Well schematic well 6608/11-4

Fig. 4.1 Well Schematic

Well: 6608/11-4

Field: PL128, Linerle

Rig: West Navigator

WELL SCHEMATIC

HOLE		CASING			LOT / FIT	TOC		CSG. SHOE				LWD LOGS	SURV CSG/ OH
SIZE	TVD MD	SIZE	TYPE / RAD. MARKERS	CENTRALIZERS	[SG]	TVD	MD	TVD	MD	RKB			
SB	378					378	378						
36"	425 425	30"	Type: 309.7 lb/ft, X-52, ST2 Drift: 27,813"		N/A			426	426			N/A	Anderdrift
12 1/4"	1357 1357	20" x 9 5/8"	18 3/4" WH hanger Interval: 378 - 388 m (extension jt): Type: 209 lb/ft, X-65 Interval: 388 - 1349 m : Type: 53.5 lb/ft, P-110, Vam Top	1 x Bow type / 4 first joints	XLOT 1.55			1349	1349			MPR-lite (GR-RES)	MWD
8 1/2"	2317 2317		-									MPR-lite (GR-RES) + Pressure	MWD

Comments:

5.7.2 P&A wellbore schematic

Fig. 4.2 P&A Schematic

Well: 6608/11-4
Field: PL128, Linerle - North east segment
Rig: West Navigator

Permanent Plug and Abondment
Well Schematic

All depths refer to RKB
RKB-MSL: 36,0 m

HOLE		CASING		LOT / FIT	TOC		CSG. SHOE				PLUGGING SEQUENCE DESCRIPTION	Press. Testing
SIZE	TVD MD	SIZE	TYPE / RAD. MARKERS	[SG]	TVD	MD	TVD	MD	RKB	MD		
SB	378				378	378						
										382	20" x 30" cut	
36"	425 425	30"	Type: 309.7 lb/ft, X-52, ST2 Drift: 27,813" 4 jnts. Incl. 30" WHH and shoe jnt.	N/A			426	426	Sea water	420	Top Surface cmt plug (#5)	Not pressure tested
									cmt plug #5	620	9 5/8" EZSV Bridge plug	70 Bar above LOT
12 1/4"	1357 1357	20" x 9 5/8"	18 3/4" WH hanger Interval: 378 - 388 m (extension jt): Type: 209 lb/ft, X-65 Interval: 388 - 1349 m : Type: 53.5 lb/ft, P-110, Vam Top	XLOT 1.55			1349	1349	1.30 SG WBM cmt plug #4	1250	Top of cmt plug (#4) - open hole / 9 5/8" csg	70 Bar above LOT
										1525	*** Non-gas tight slurry *** Top of cmt plug (#3)	
									cmt plug #3	1790	*** Gas-tight slurry *** Top of cmt plug (#2)	
8 1/2"	2317 2317								cmt plug #2	2055	*** Gas-tight slurry *** Top of cmt plug (#1)	
							2317	2317	cmt plug #1	2315	*** Gas-tight slurry *** Bottom of cmt plug (#1)	

Comments:

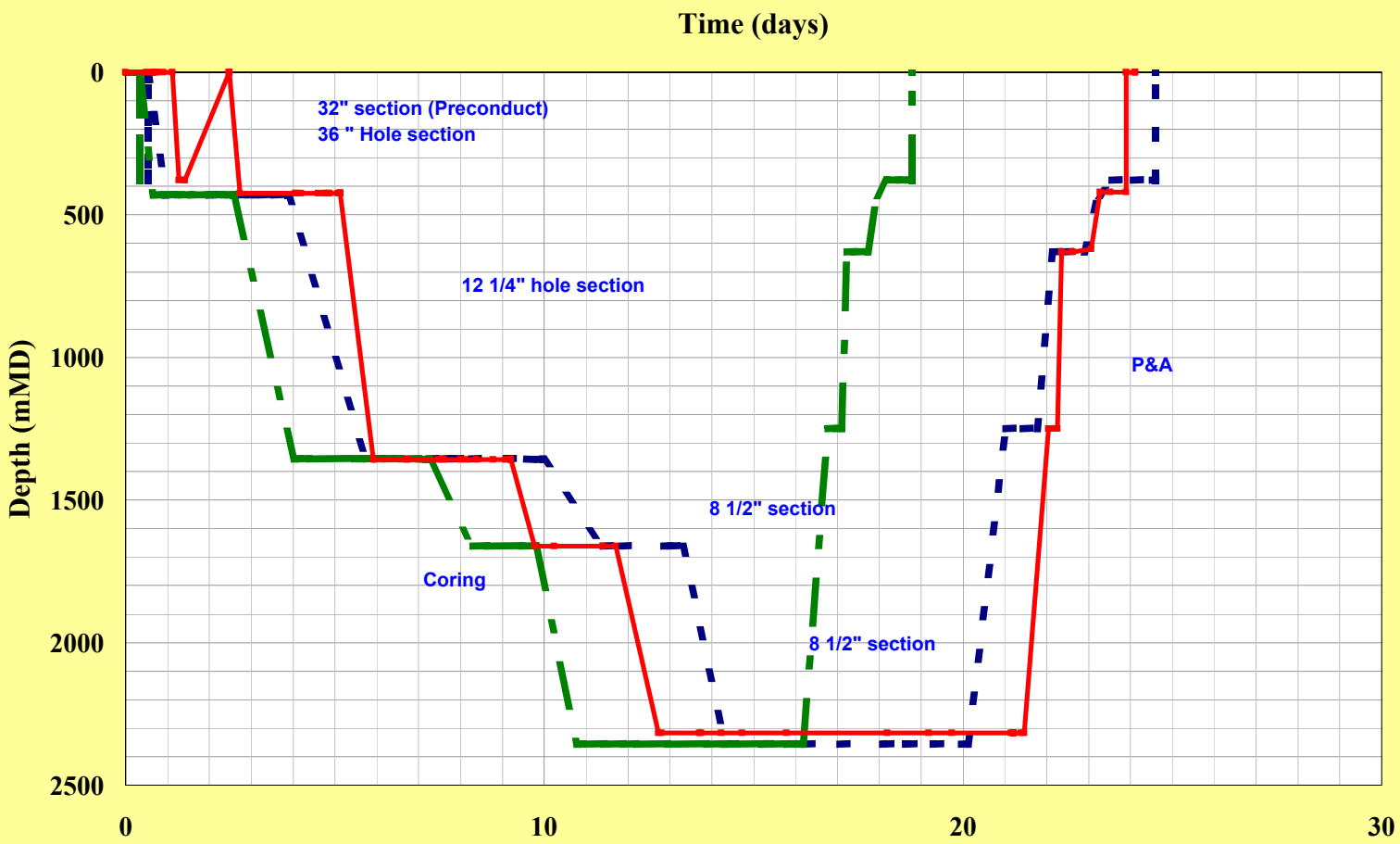
5.7.3 Time/depth curve

Fig. 4.3 Time/Depth curve

STATOIL

Time - Depth Plot

Linerle



Budget time (days)
p10 (days)
Actual time (days)

Updated date/time:
Date: 07.06.2004
Time: 13:31

Start date/time:
Date: 29.04.2004
Time: 20:30

Finish date/time:
Date: 23.05.2004
Time: 23:00

Total budget time:
24,6

Time used:
24,1

Time ahead of budget:
0,5

Comments:

5.7.4 Timeplanner

Table 4.1 Timeplanner

Project planner

LINERLE PROJECT (6608/11-4)

T.O128A.AP.21220_MAIN

		Start time	End time	Budget time hrs	Acc Budget days	Tech limit hrs	Acc tech days	Planned time hrs	Actual time hrs	Acc actual days	% comp	Description
		29.04.04 20:30	**30.04.04 12:30**	**13,0**	**0,5**	**4,0**	**0,2**	**26,0**	**16,0**	**0,7**		**MOVE [NO 6608/11-4]**
1	Thu	29.04.04 20:30	30.04.04 08:30	8,0	0,3	**4,0**	0,2	6,0	**12,0**	**0,5**	100	Transit from Alve to Linerle (17 Nm, 8 Knoph)
2	Fri	30.04.04 08:30	30.04.04 12:30	5,0	0,5	**0,0**	0,2	20,0	**4,0**	**0,7**	100	Positioned rig. RD K/C lines from moonpool.
		30.04.04 12:30	**02.05.04 08:00**	**0,0**	**0,0**	**4,0**	**0,2**	**30,0**	**43,5**	**1,8**		**32" [NO 6608/11-4]**
3	Fri	30.04.04 12:30	30.04.04 14:00	0,0	0,5	**4,0**	0,3	4,0	**1,5**	**0,7**	100	M: RU and install IHC equipment on drillfloor and deck
4	Fri	30.04.04 14:00	30.04.04 14:30	0,0	0,5	**0,0**	0,3	3,0	**0,5**	**0,8**	100	M : Lift in 32" conductor from riser chute and place same in RT.
5	Fri	30.04.04 14:30	30.04.04 18:00	0,0	0,5	**0,0**	0,3	2,0	**3,5**	**0,9**	100	M : Lift in hammer from pipe chute.
6	Fri	30.04.04 18:00	30.04.04 23:30	0,0	0,5	**0,0**	0,3	5,0	**5,5**	**1,1**	100	M : Lower hammer and install same in conductor.
7	Fri	30.04.04 23:30	01.05.04 03:00	0,0	0,5	**0,0**	0,3	3,0	**3,5**	**1,3**	100	M : Run conductor through RT and install umbilical.
8	Sat	01.05.04 03:00	01.05.04 06:00	0,0	0,5	**0,0**	0,3	6,0	**3,0**	**1,4**	100	M : Run conductor/hammer on 5 1/2" DP to seabed.
9	Sat	01.05.04 06:00	01.05.04 06:30	0,0	0,5	**0,0**	0,3	2,0	**0,5**	**1,4**	100	M : Stab conductor into seabed and self pentrate same +/- 7 m.
10	Sat	01.05.04 06:30	02.05.04 08:00	0,0	0,5	**0,0**	0,3	5,0	**25,5**	**2,5**	100	M : Hammer conductor- No go after 5 m. POOH with hammer and conductor.
		02.05.04 08:00	**04.05.04 23:30**	**80,0**	**3,3**	**54,0**	**2,3**	**49,0**	**63,5**	**2,6**		**36" [NO 6608/11-4]**
11	Sun	02.05.04 08:00	02.05.04 14:00	10,0	1,0	**8,0**	0,7	7,0	**6,0**	**2,7**	100	A : RIH with 36" BHA to seabed.
12	Sun	02.05.04 14:00	03.05.04 22:00	25,0	2,0	**4,0**	0,8	15,0	**32,0**	**4,1**	100	A : Drill 36" hole to 423 m (respudded 10 m off location due to boulders).
13	Mon	03.05.04 21:59	03.05.04 22:00	3,0	2,1	**2,0**	0,9	2,0	**0,0**	**4,1**	100	A : POOH to seabed.
14	Mon	03.05.04 22:00	04.05.04 01:00	8,0	2,5	**8,0**	1,3	5,0	**3,0**	**4,2**	100	A : Circulate hole clean and displace to weighted 1.35 SG mud.
15	Tue	04.05.04 01:00	04.05.04 11:00	6,0	2,7	**2,0**	1,3	1,0	**10,0**	**4,6**	100	M : RIH with 30" conductor on 5 1/2" DP to seabed (prep. to run BOP in Main)
16	Tue	04.05.04 11:00	04.05.04 14:30	5,0	2,9	**5,0**	1,5	3,0	**3,5**	**4,8**	100	M : Stab in with 30" conductor and RIH to TD.
17	Tue	04.05.04 14:30	04.05.04 16:30	4,0	3,1	**1,0**	1,6	2,0	**2,0**	**4,8**	100	M : Pump and displace X-lite cement.
18	Tue	04.05.04 16:30	04.05.04 17:30	3,0	3,2	**10,0**	2,0	2,0	**1,0**	**4,9**	100	M : Release RT and landing string. POOH.
19	Tue	04.05.04 17:30	04.05.04 22:30	8,0	3,5	**8,0**	2,3	6,0	**5,0**	**5,1**	100	A : MU and RIH with 12 1/4" BHA.
20	Tue	04.05.04 22:30	04.05.04 23:30	8,0	3,9	**6,0**	2,6	6,0	**1,0**	**5,1**	100	A : Drill out and ream 30" conductor shoe.
		04.05.04 23:30	**09.05.04 01:30**	**146,0**	**6,1**	**113,0**	**4,7**	**89,0**	**98,0**	**4,1**		**12 1/4" [NO 6608/11-4]**
21	Tue	04.05.04 23:30	05.05.04 18:30	45,0	5,8	**35,0**	4,0	35,0	**19,0**	**5,9**	100	A : Drill 12 1/4" hole to appr. 1350 m.
22	Wed	05.05.04 18:30	06.05.04 14:00	5,0	6,0	**4,0**	4,2	4,0	**19,5**	**6,7**	100	A : Circulate bottoms up and POOH.
23	Thu	06.05.04 13:59	06.05.04 14:00	6,0	6,2	**5,0**	4,4	5,0	**0,0**	**6,7**	100	A : POOH with landing string.
24	Thu	06.05.04 14:00	07.05.04 07:30	32,0	7,5	**26,0**	5,5	13,0	**17,5**	**7,5**	100	A : RU and run 18 3/4" WH x 9 5/8" csg to 1350 m.
25	Fri	07.05.04 07:30	07.05.04 10:30	5,0	7,8	**3,0**	5,6	2,0	**3,0**	**7,6**	100	A : Pump and displace cmt.
26	Fri	07.05.04 10:30	07.05.04 11:00	2,0	7,8	**2,0**	5,7	1,0	**0,5**	**7,6**	100	A : Release RT and wash WH.
27	Fri	07.05.04 11:00	07.05.04 20:30	10,0	8,3	**7,0**	6,0	1,0	**9,5**	**8,0**	100	M : Cont. run BOP and riser and land same (start MU 8 1/2" BHA in Aux rig).
28	Fri	07.05.04 20:30	07.05.04 23:30	20,0	9,1	**15,0**	6,6	10,0	**3,0**	**8,1**	100	M : RD BOP handling equipment and prepare for RIH with 8 1/2" BHA.
29	Fri	07.05.04 23:30	08.05.04 05:30	0,0	9,1	**0,0**	6,6	6,0	**6,0**	**8,4**	100	M/A: Planned rig maintenance
30	Sat	08.05.04 05:30	08.05.04 15:00	12,0	9,6	**10,0**	7,0	8,0	**9,5**	**8,8**	100	M : RIH with 8 1/2" BHA -function test BOP and pressure test csg/BOP.
31	Sat	08.05.04 15:00	08.05.04 22:30	6,0	9,8	**4,0**	7,2	2,0	**7,5**	**9,1**	100	M : Drill shoetrack and 3 m new formation with SW.
32	Sat	08.05.04 22:30	09.05.04 01:30	3,0	10,0	**2,0**	7,3	2,0	**3,0**	**9,2**	100	M : Place Hi-vis pill and perform XLOT.
		09.05.04 01:30	**21.05.04 01:30**	**224,0**	**9,3**	**174,5**	**7,3**	**256,0**	**288,0**	**12,0**		**8 1/2" [NO 6608/11-4]**
33	Sun	09.05.04 01:30	09.05.04 15:00	35,0	11,4	**45,0**	9,2	30,0	**13,5**	**9,8**	100	M : Drill 8 1/2" hole to top reservoar. Check for HC.
34	Sun	09.05.04 15:00	10.05.04 02:00	10,0	11,8	**0,0**	9,2	8,0	**11,0**	**10,2**	100	M : Circulate hole clean and POOH for coring.
35	Mon	10.05.04 02:00	11.05.04 06:00	28,0	13,0	**0,0**	9,2	42,0	**28,0**	**11,4**	100	M : RIH. Cut 2 cores (52 m). POOH.
36	Tue	11.05.04 06:00	11.05.04 13:30	7,5	13,3	**8,0**	9,5	8,0	**7,5**	**11,7**	100	M: RIH w/ 8 1/2" BHA

Project planner

LINERLE PROJECT (6608/11-4)

T.O128A.AP.21220_MAIN

		Start time	End time	Budget time hrs	Acc Budget days	Tech limit hrs	Acc tech days	Planned time hrs	Actual time hrs	Acc actual days	% comp	Description
		09.05.04 01:30	**21.05.04 01:30**	**224,0**	**9,3**	**174,5**	**7,3**	**256,0**	**288,0**	**12,0**		**8 1/2" [NO 6608/11-4]**
37	Tue	11.05.04 13:30	12.05.04 14:00	24,5	14,3	**1,0**	9,5	30,0	**24,5**	**12,7**	100	M : Drill 8 1/2" hole to extended TD at approx. 2320 m.
38	Wed	12.05.04 14:00	12.05.04 15:30	1,5	14,4	**3,0**	9,7	3,0	**1,5**	**12,8**	100	M : Circulate hole clean.
39	Wed	12.05.04 15:30	13.05.04 13:30	19,0	15,2	**12,0**	10,2	22,0	**22,0**	**13,7**	100	M : Back ream. Wiper trip. Circulate and POOH for WL logs. RB 8 1/2" BHA.
40	Thu	13.05.04 13:30	13.05.04 14:30	1,0	15,2	**0,5**	10,2	1,0	**1,0**	**13,8**	100	M : RU for WL logging.
41	Thu	13.05.04 14:30	14.05.04 02:00	13,5	15,8	**10,5**	10,6	11,0	**11,5**	**14,2**	100	M : WL log run #1 : PEX-HRLA-ECS-DSI
42	Fri	14.05.04 02:00	14.05.04 14:00	10,5	16,2	**7,5**	10,9	8,0	**12,0**	**14,7**	100	M : WL log run #2 : CMR+ - FMI
43	Fri	14.05.04 14:00	15.05.04 15:30	20,0	17,1	**18,0**	11,7	18,0	**25,5**	**15,8**	100	M : WL log run #3 : MDT (press. points + water samples)
44	Sat	15.05.04 15:30	18.05.04 01:00	25,0	18,1	**22,5**	12,6	24,0	**57,5**	**18,2**	100	M : WL log run #4 : MDT (mini DST, oil samples). Stuck, cut & thread.
45	Tue	18.05.04 01:00	19.05.04 01:00	12,5	18,6	**9,5**	13,0	12,0	**24,0**	**19,2**	100	M : WL log run #5 : VSP-MSIP-EMS-GPIT
46	Wed	19.05.04 01:00	19.05.04 14:00	0,0	18,6	**0,0**	13,0	14,0	**13,0**	**19,7**	100	M : RIH and perform wiper trip to approx. 1750 m. POOH.
47	Wed	19.05.04 14:00	21.05.04 00:00	0,0	18,6	**24,0**	14,0	24,0	**34,0**	**21,1**	100	M : WL log run #6 : MDT (mini DST + oil samples)
48	Fri	21.05.04 00:00	21.05.04 01:30	1,0	18,7	**0,5**	14,0	1,0	**1,5**	**21,2**	100	M : RD WL equipment.
49	Fri	21.05.04 00:00	21.05.04 00:00	15,0	19,3	**12,5**	14,6	0,0	**0,0**	**21,2**	100	M : WL log run #7 : MSCT
		21.05.04 01:30	**23.05.04 23:00**	**127,5**	**5,3**	**106,0**	**4,4**	**69,0**	**69,5**	**2,9**		**PERM P&A [NO 6608/11-4]**
50	Fri	21.05.04 01:30	21.05.04 06:00	16,0	20,0	**15,0**	15,2	6,0	**4,5**	**21,4**	100	M : RIH with 3 1/2" cement stinger on 5 1/2" DP.
51	Fri	21.05.04 06:00	21.05.04 07:30	4,0	20,1	**3,0**	15,3	2,0	**1,5**	**21,5**	100	M : Circulate hole clean.
52	Fri	21.05.04 07:30	21.05.04 21:30	21,5	21,0	**14,0**	15,9	15,0	**14,0**	**22,0**	100	M : Place a 3-stage cmt plug in OH and 1 plug 100 m into 9 5/8" csg.
53	Fri	21.05.04 21:30	22.05.04 01:00	10,0	21,4	**13,0**	16,4	4,0	**3,5**	**22,2**	100	M : POOH with cmt stinger.
54	Sat	22.05.04 01:00	22.05.04 02:30	8,0	21,8	**8,0**	16,8	3,0	**1,5**	**22,3**	100	M : WOC - test cmt plug. Meanwhile RIH with WB RT and 9 5/8" EZSV.
55	Sat	22.05.04 02:30	22.05.04 05:00	9,0	22,1	**8,0**	17,1	5,0	**2,5**	**22,4**	100	M : Retrieve WB and set 9 5/8" EZSV at 630 m.
56	Sat	22.05.04 05:00	22.05.04 11:30	6,0	22,4	**6,0**	17,4	4,0	**6,5**	**22,6**	100	M :Pressure test packer. Displace well to SW and POOH. RIH w/ WB RT and retrieve WB.
57	Sat	22.05.04 11:30	22.05.04 22:00	12,0	22,9	**8,0**	17,7	10,0	**10,5**	**23,1**	100	M : Prepare and unlatch BOP. Start pull BOP and riser in Main rig.
58	Sat	22.05.04 22:00	23.05.04 03:00	8,0	23,2	**8,0**	18,0	5,0	**5,0**	**23,3**	100	A : RIH with 5 1/2" DP and set surface cmt plug. POOH.
59	Sun	23.05.04 03:00	23.05.04 09:00	8,0	23,6	**6,0**	18,3	6,0	**6,0**	**23,5**	100	A : MU WH cut BHA and RIH.
60	Sun	23.05.04 09:00	23.05.04 18:00	12,0	24,1	**10,0**	18,7	5,0	**9,0**	**23,9**	100	A : Cut WH and POOH with same / pull BOP.
61	Sun	23.05.04 17:59	23.05.04 18:00	11,0	24,5	**5,0**	18,9	4,0	**0,0**	**23,9**	100	M : Cont. pull BOP and riser. RD surface equipment.
62	Sun	23.05.04 18:00	23.05.04 23:00	2,0	24,6	**2,0**	19,0	0,0	**5,0**	**24,1**	100	M : Retrieve transponders. R/D K/C lines.
				24,6	**days**	**19,0**	**days**	**21,6**	**24,1**	**days**		

5.7.5 Wellhead system

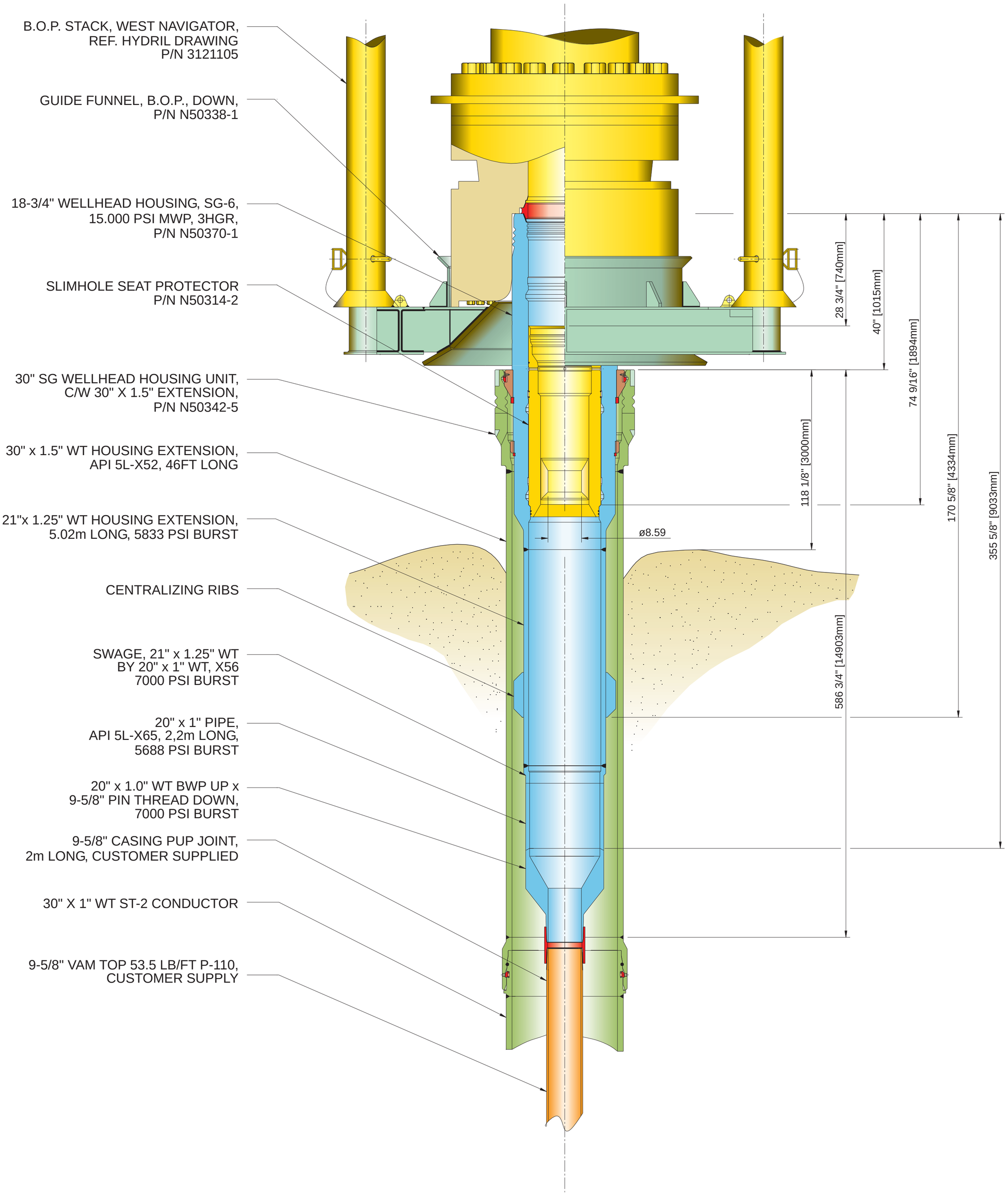
Fig. 4.4 Wellhead System Schematic

West Navigator

Well 6608/11-4
'Linerle'

STATOIL

Smedvig



SG-6 Wellhead System
18-3/4" x 15,000 PSI

Concept AS

ABB Offshore Systems AS

Division Subsea

ABB

Drawing Number: N600891-3

5.7.6 Drilling fluids

Table 4.2 Summary of Drilling fluids program

FINAL DRILLING FLUIDS PROGRAMME

Well: 6608/11-4

Field: PL128, Linerle - North east segment

Rig: West Navigator

HOLE SIZE	HOLE TVD MD	CASING SIZE	CASING TVD MD	MUD TYPE	MW [SG]	LGS [KG/m³]	10 sec. [Pa]	10 min. [Pa]	Funnel Visc.	Fann 3 rpm	O / W ratio	PV [mPa]	API FL [ml]	HTHP FL [ml]	MBT [KG/m³]	pH	Kcl [KG/m³]	Glyc. [%]	Ca ++ [mg/l]	Sulphate [mg/l]	Usage Volume [m³]
36"	425 425	**30"**	426 426	SW/ Bentonite/ Polymer	1,03 - 1,35				>150							8 - 9					232
				Because of slow drilling, more sweeps than estimated where used.																	
12 1/4"	1357 1357	**9 5/8"**	1349 1349	SW/ Bentonite/ Polymer	1,03 - 1,30				>150							8 - 9					1061
				Pumped 5 - 10m3 HiVis sweeps every 15m. At TD a Hi Vis pill was swept around, before displacing the well to 1.30sg mud. Worked tight spots by pumping 1.3sg mud at the same time to aid on the way out of hole. Pulled out to 30" casing shoe and circulated. Ran back to bottom and displaced the well to 1.30sg mud again.																
8 1/2"	2317 2317	**0**		KCl/ Pac/ Glycol	1,30	26 - 107	3 - 4	4 - 6	na	5 - 6	na	14 - 17	1,8 - 2,2	na	10 - 46	8,6 - 9,3	133 - 148	3,5 - 4	400 - 680	169 - 211	175
				After the XLOT, the well was displaced to Glydril 99% KCl, and special attention was paid on the sulphate content of the fluid After the displacement, it was observed that the level increased above the programmed specification (200 mg/litre). This was probably due to the residues from the rat hole. However, the sulphate level dropped as we continued drilling, and was recorded well within the specifications prior to start logging. The mud properties were maintained by diluting the active system with 2-4 m³ an hour of premix with slightly higher concentration of chemicals than in the initially mud. Occationally both KCl and Duotec was added directly to active to fine tune the properties.																		

5.7.7 Cementing data

Table 4.3 Summary of cementing data

Well: 6608/11-4
Field: PL128, Linerle
Rig: West Navigator

FINAL CEMENT PROGRAMME

HOLE		CASING SHOE		TOC	VOLUME/ EXCESS	CEMENT SLURRY DESIGN										SPACER	DISPLACEMENT
SIZE	TVD MD	SIZE	TVD MD	TVD MD		Components	Lead [ltr/100kg]	Tail [ltr/100kg]	Density [SG]	Yield [ltr/100kg]	Stat. / Circ. Temp [°C]	Thickening time [hrs to 30 Bc]	API Free Water [%]	API Fluid loss [cc/30min]	24 hrs C.S. [psi]		Fluids and Rates
36"	426 426	**30"**	426 426	Sea bed Sea bed	40.3 m3 300 %	X-lite cement $CaCl_2$ liquid NF-6 Seawater		4,50 0,10 53,84	1,52	107,40 Code DWLSP	6-8 API	03:19	n/a	n/a	800	30 m3 Sea water	Sea water 1000 lpm
12 1/4"	1349 1349	**9 5/8"**	1349 1349	Sea bed Sea bed	Lead: 44 m3 Tail: 15 m3 50% on lead	Norcem "G" + 0,1 % EZ-FLO Econolite HR-4L NF-6 Sea water Fresh water	3,20 2,00 0,10 93,56 -	- 1,00 0,10 - 42,92	L: 1,56 T: 1,92	L: 129.95 Code STL40 T: 75,11 Code MPT14	38/30 API	L : 5:18 T: 4:58	L: 0.3 T: 1.1	n/a	L:+/- 500 T: 1400	60 m3 Sea water	Sea water 3000 lpm
8 1/2"	2317	**OH Plug #1** **#2 & #3**		1516	#1 = 11 m3 #2 = 11.6 m3 #3 = 11.6 m3 20 %	Norcem "G" + 0,1 % EZ-FLO Gascon Halad-613L CFR-5LE+ HR-5L NF-6 Fresh water		3,50 9,00 2,50 0,50 0,10 31,10	1,90	77,76 Code GTT90	87/70 API	04:28	0	54	2400	3 x 5 m3 1.60 SG Tuned Spacer	WBM 2500 lpm
		Plug #4	1516	1250	13 m3	Norcem "G" + 0,1 % EZ-FLO Halad-613L HR-4L NF-6 Fresh water		0,50 0,80 0,10 42,65	1,92	75,11 Code MPT05	50/40 API	03:14	0,58	n/a	2860	8 m3 1.60 SG Tuned Spacer	WBM 2500 lpm
		Plug #5	620	420	7.4 m3	Norcem "G" + 0,1 % EZ-FLO NF-6 Sea water		0,10 46,74	1,90	77,90 Code STTNT	15/13 API	> 4 hrs	n/a	n/a	+/-1000	Sea water	Sea water

5.7.8 Bottom hole assemblies

BHA report

Wellbore: NO 6608/11-4

BHA seq: 1 BHA category: Drilling BHA description: 17 1/2" x 26/36" HO assembly

BHA no: 1

String component	OD in	ID in	Length m	Acc length m
BIT	17,500		0,40	0,40
FLOAT SUB	10,937		0,77	1,17
HOLE OPENER	36,000		4,40	5,57
ANDERDRIFT	9,500	3,000	2,53	8,10
XO SUB	9,500	3,000	0,59	8,69
TOTCO RING				8,69
DRILL COLLAR	9,500	3,000	46,03	54,72
XO SUB	9,500	3,000	0,94	55,66
DRILL COLLAR	8,000	3,000	55,42	111,08
XO SUB	8,000	3,000	0,95	112,03
HWDP 5 1/2"	5,500		84,12	196,15
DRILL PIPE	5,500			196,15

BHA seq: 2 BHA category: Drilling BHA description: 12 1/4" Pendulum assembly

BHA no: 2

String component	OD in	ID in	Length m	Acc length m
BIT	12,250		0,31	0,31
BIT SUB W/FLOAT	8,250	2,813	0,91	1,22
X-O PIN X PIN	8,250	2,813	0,90	2,12
MPR SUB	8,250	2,813	5,03	7,15
MWD DCP	8,250	2,813	11,19	18,34
SAVER SUB	8,250	2,813	0,68	19,02
PONY COLLAR	8,000	2,813	2,95	21,97
TOTCO RING				21,97
STRING STAB	12,250	2,813	1,91	23,88
DRIL COL	8,000	2,813	8,83	32,71
STRING STAB	12,250	2,813	1,68	34,39
DRIL COL	8,000	2,813	73,30	107,69
JAR	8,000	2,750	9,65	117,34
DRIL COL	8,000	2,813	27,26	144,60
X-OVER,	8,000	3,000	0,88	145,48
HWDP 5 1/2"	5,500	3,000	86,71	232,19
DP 5 1/2"	5,500			232,19

BHA seq: 3 BHA category: Drilling BHA description: 8 1/2 packed core point finder assembly

BHA no: 3

String component	OD in	ID in	Length m	Acc length m
BIT	8,500		0,33	0,33
STAB NB CPF	8,500	2,750	1,21	1,54
MWD, ONTRAK W/GR&RES	6,750	2,750	5,02	6,56
STAB MODULAR	8,500	2,750	1,26	7,82
BCPM	6,750	2,750	3,21	11,03
X-OVER STOP SUB	6,750	2,750	0,50	11,53
FLOAT SUB	6,500	2,750	0,48	12,01
STAB. W/TOTCO	8,500	2,750	2,08	14,09
DRIL COL	6,500	2,813	75,29	89,38
JAR	6,500	2,813	8,52	97,90
DRIL COL	6,500	2,813	28,28	126,18
HWDP 5"	5,000	3,000	83,06	209,24
DP 5"	5,000	4,276	865,62	1074,86
X-OVER	5,500	4,400	1,11	1075,97
DP 5 1/2"	5,500	4,778		1075,97

BHA seq: 4 BHA category: Drilling BHA description: Coring Assembly

BHA no: 4

String component	OD in	ID in	Length m	Acc length m
CORE HEAD	8,500		0,36	0,36
STABILIZER	8,468	4,000	1,22	1,58
CORE BARREL	6,750	4,000	3,35	4,93
STABILIZER	8,468	4,000	1,22	6,15
CORE BARREL	6,750	4,000	3,35	9,50
STABILIZER	8,468	4,000	1,22	10,72
CORE BARREL	6,750	4,000	7,92	18,64
STABILIZER	8,468	4,000	1,22	19,86
CORE BARREL	6,750	4,000	7,92	27,78
STABILIZER	8,468	4,000	1,22	29,00
CORE BARREL EXT	6,750	4,000	0,86	29,86
SAFETY JOINT	6,750		0,59	30,45
FLOAT SUB	7,000	3,000	0,89	31,34
DRILL COLLAR	6,500	2,813	18,83	50,17
STABILIZER	8,500	2,813	1,79	51,96
DRILL COLLAR	6,500	2,813	56,46	108,42
JAR	6,500	2,813	8,52	116,94
DRILL COLLAR	6,500	2,813	28,28	145,22
HWDP 5"	5,000	3,000	83,06	228,28
DRILL PIPE	5,000	3,000	865,62	1093,90
X-OVER	7,000	3,000	1,11	1095,01
DRILL PIPE	5,500			1095,01

BHA seq: 5 BHA category: Drilling BHA description: 8 1/2 packed core point finder assembly

BHA no: 3

String component	OD in	ID in	Length m	Acc length m
BIT	8,500		0,33	0,33
STAB NB CPF	8,500	2,750	1,21	1,54
MWD, ONTRAK W/GR&RES	6,750	2,750	5,02	6,56
STAB MODULAR	8,500	2,750	1,26	7,82
BCPM	6,750	2,750	3,21	11,03
X-OVER STOP SUB	6,750	2,750	0,50	11,53
FLOAT SUB	6,500	2,750	0,48	12,01
STAB. W/TOTCO	8,500	2,750	2,08	14,09
DRIL COL	6,500	2,813	75,29	89,38
JAR	6,500	2,813	8,52	97,90
DRIL COL	6,500	2,813	28,28	126,18
HWDP 5"	5,000	3,000	83,06	209,24
DP 5"	5,000	4,276	865,62	1074,86
X-OVER	5,500	4,400	1,11	1075,97
DP 5 1/2"	5,500	4,778		1075,97

BHA seq: 6 BHA category: Drilling BHA description: BHA for wiper trip between logs.

BHA no: 5

String component	OD in	ID in	Length m	Acc length m
CASING CUTTER			13,34	13,34
DRIL COL	8,000	2,813	55,16	68,50
X-OVER	5,500	4,400	0,88	69,38
DP 5 1/2"	5,500	4,778		69,38

5.7.9 Bit record

Bit record

Wellbore: NO 6608/11-4

Run no	Bit size	Bit no	BHA no	Bit type	IADC code	Bit manufacturer	Serial no	Nozzles (n/32") no x n	no x n	no x n	no x n	Flow area in2
1	17 1/2"	1RR	1	MXT1	115	Hughes Christensen	601267	3 x 18	x	x	x	,746
1	26"/36"	HO	1	HO HEAVY DUTY	422	Smith Red Baron	E62756	6 x 12	6 x 11	x	x	1,220
2	12 1/4"	2	2	EBXSC1S	117W	Security DBS	10624161	1 x 16	1 x 16	2 x 18	x	,890
3	8 1/2"	3	3	FS2565E	S424	Security DBS	10527916	5 x 13	x	x	x	,649
4	8 1/2"	4RR	4	CT103	M623	DIAMANT BOART S	7950351	x	x	x	x	
5	8 1/2"	4RR2	4	CT103	M623	DIAMANT BOART S	7950351	x	x	x	x	
6	8 1/2"	3RR2	3	FS2565E	S424	Security DBS	10527916	5 x 13	x	x	x	,649
7	8 1/2"	3RR3	6	FS2565E	S424	Security DBS	10527916	5 x 13	x	x	x	,649

Wellbore: NO 6608/11-4

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/hr	Min WOB ton	Max WOB ton	Min RPM	Max RPM	Torque Min Nm	Torque Max Nm
1	17 1/2"	5000	116	378	428	50,0	50,0	21,5	29,6	2,3	0	4	110	140	4000	9000
1	26"/36"	5000	116	378	425	47,0	48,0	21,5	29,6	2,2	0	4	110	140	4000	9000
2	12 1/4"	4500	252	428	1357	929,0	931,0	11,5	20,7	80,8	1	18	60	150	2000	11000
3	8 1/2"	2500	226	1357	1662	305,0	342,0	7,4	22,2	41,2	1	6	60	180	2000	13000
4	8 1/2"	952	89	1662	1688	26,0	26,0	1,6	2,7	16,3	4	12	87	101	5000	7000
5	8 1/2"	950	81	1688	1714	26,0	26,0	1,5	2,6	17,3	6	10	81	99	4000	10000
6	8 1/2"	2450	215	1714	2317	603,0		16,8	35,1	35,9	1	12	96	200	6000	28000
7	8 1/2"															

Wellbore: NO 6608/11-4

Run no	Bit size	IADC dull grading I	O	DC	L	B	G	OC	RP	Remarks
1	17 ½"	2	3	WT	A	E	1	WT	TD	HO assembly drilled depth is 17 1/2" hole. 192kREVS.
1	26"/36"	1	1	NO	G	F	0	NO	TD	Drilled depth is to 36" cutter depth. Total 192 Krevs.
2	12 ¼"	2	2	NO	A	E	I	NO	TD	Drilled cement from 425 m to 428 m. New Formation from 428 m to 1357 m. Krevs: 89
3	8 1/2"	1	1	NO	A	X	I	NO	CP	Drilled shoe track from 1320 m to 1349 m. Drilled rat hole from 1349 m to 1357 m. Krevs: 82
4	8 1/2"	1	1	NO	A	X	I	NO	PR	Krevs: 10 Core barrel jammed at 1688 m. Recovery: 72,9 %.
5	8 1/2"	2	1	BT	N	X	I	NO	PR	krevs: 9 Core barrel jammed at 1714 m.
6	8 1/2"	6	2	BT	S	X	I	NO	TD	Bit in Hole. Krevs 181
7	8 1/2"	6	2	BT	S	X	IN	NO	LOG	Bit grading as previous grading.

6 Appendices

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

30.04.2004 Rig in transitt from Alve to the Linerle location.

01.05.2004 Sailed and positioned rig at new location "Linerle". Made up 32" x 30" Conductor w/ IHC hydraulic hammer and ran same down to seabed at 375,3 meter (RKB - Seabed, mid tide). Prepared to drive Conductor down using Hammer.

02.05.2004 Tagged seabottom at 375,3 m. Lowered conductor to 378 m. Hammered conductor to 380 m. Suspended hammering due to high inclination. Corrected inclination by repositioning ship. Hammered condutor to 381 m. Suspended hammering due to refusal. Released conductor from shackles with ROV. Attempted to retrieve hammer. Made several attempts without success. Reconnected conductor shackles with ROV. Attempted to pull conudtor free. RIH and washed with open ended drillpipe around conductor to 380 m from auxiliary rig. Attempted to pull conductor free. POOH with open ended drillpipe. MU 17 1/2" bit and RIH. Washed/drilled on sides of conductor from seabed to 382 m. Maintained 35 ton overpull on conductor.

03.05.2004 Pulled stuck 30" x 32" Conductor free from seabed and out to surface. Cut slots in Conductor shoe and cleaned same. Pulled stuck Hammer out of Coductor and laid same down on skate and secured. Attempted to drill new 36" hole in same hole as Conductor were hammered -Neg. Respudded well 10 m East of original location and drilled / holeopened to 36" from seabed to 399 meter.

04.05.2004 Drilled 17 1/2" X 26" X 36" hole from 399 m to 425 m. Circulated hole clean and filled same w/ 1,35 sg WBM. POOH w/ BHA. P/U 30" casing w/ wellhead. Installed bulleyes and prepared to run 30" casing in water.

05.05.2004 Ran 30" conductor and cemented same w/ 30" casing at 426 meter. Drilled 30" casing shoe and cleaned rat hole. Drilled new formation w/ 12 1/4" bit from 428 m to 830 meter. Made up cement stand for cementing 9 5/8" casing. Prepared and R/U to run BOP.

06.05.2004 Drilled 12 1/4" hole from 830 m to 1357 m. Attempted to POOH, observed increasing overpull, max 15 ton. Pumped out of hole to 760 m. Observed max 15 ton overpull between 1320m and 1240 m , and between 1180 m and 900 m. Circulated BU at 760 m. POOH to 422 m. Circulated cunductor clean. RIH to 1357 m. RU to run BOP and ran BOP to 305 m in main rig.

07.05.2004 Displaced hole with 90 m3 1,30 SG mud. POOH from 1357 m. RU and ran 9 5/8" casing to 1330 m. PU cement stand and prepared to land casing in wellhead. Prepared to land BOP with Main rig.

08.05.2004 Landed 9 5/8" casing in wellhead. Casing shoe at 1348,7 m. Cemented casing. Released running tool. Positioned rig over well and landed BOP. Installed diverter. Rigged down BOP handling equipment. Performed planned maintenance on Main rig. POOH with running tool on Aux rig. LD excess casing stands, cement head, and prepared 8 1/2" BHA on Aux rig.

09.05.2004 RIH with 8 1/2" assembly to 209 m. Tested wellhead connector to 180 bar. RIH from 209 m to 845 m. Function tested BOP. RIH from 845 m to 1095 m. Tested MWD and held well control exercise. RIH from 1095 m to 1320 m. Tagged plugs on float collar at 1320 m. Drilled shoe track from 1320 m to 1349 m. Cleaned rathole and drilled 3 m new formation from 1349 m to 1360 m. Performed XLOT to 1,55 SG EMW. Displaced well to 1,30 SG KCl mud. Drilled 8 1/2" hole from 1360 m to 1415 m.

10.05.2004 Drilled 8 1/2" hole from 1415 m to 1662 m. Circulated hole clean . POOH from 1662 m to 1332 m. Flow checked well. Waited for coring equipment. RIH to 1662 m and circulated hole clean while waiting for coring equipment from shore. POOH from 1662 m. RIH with 8 1/2" coring assembly to 1125 m.

11.05.2004 Ran in with coring assembly to TD at 1662m. Cut core #1 from 1662m, until jamming off at 1688m. POOH with core #1 (72,9% rec.). Ran in with core assembly #2, cut core #2 from 1688m to 1714m, where core again jammed off. POOH with core #2. Prepare to RIH with 8 1/2" drilling assembly.

12.05.2004 RIH w/ 8 1/2" BHA. Logged across the cored interval w/MWD, from 1651m to 1714m. Drilled 8 1/2" hole from 1714m to 2141m.

13.05.2004 Drilled 8 1/2" hole from 2141 to TD of well at 2317 m. Circulated the hole clean and backreamed out of the hole to the 9 5/8" casing shoe at 1349m. Circulated bottoms up and until shakers were clean. Tripped in to TD and circulated bottoms up.

14.05.2004 Finished circulating the hole clean. POOH for logging. R/u for logging. Ran log #1: PEX-HRLA-DSI-ECS. Ran in with log #2: CMR+ - FMI.

15.05.2004 Completed log run no 2: CMR+ - FMI. Ran log no 3: MDT - GR - ACTS.

16.05.2004 Completed log run no 3: MDT - GR - ACTS. RU tool string for run no 4. Trouble shot and rectified communication problem.
Ran logging run no 4: MDT, oil sampling + mini DST.

17.05.2004 Logging run no 4: MDT, oil sampling + mini DST. Performed mini DST no 1. MDT tool stuck on DST no 2. Prepared for cut and thread. RIH with overshot on 5" DP to 300 m.

18.05.2004 Ran wireline overshot on DP over wireline cable for stuck MDT-tool (cut and thread) to 1646 m. Circulated btms up. Engaged fish. Released electrical weak point. Retrieved wireline cable. POOH with fish (MDT-tool) . LD same. RU and ran logging run no 5: VSP - MSIP - EMS - GPIT to 750 m.

19.05.2004 Performed logging run no 5: VSP to 2300 m. RIH w. 8 1/2" BHA for wiper trip to 1470 m.

20.05.2004 Performed wiper trip to 1750 m. Ran logging run no 6: MDT, sampling + mini DST.

21.05.2004 Completed logging run no 6: MDT, sampling + mini DST. RIH with cmt stinger to TD.

22.05.2004 Circulated hole clean. Plugged back open hole and 100 m into csg with 4 cmt plugs. POOH. RIH with EZSV and WB-RT. Tested cmt plug to 105 bar. Pulled WB free. Set 9 5/8" EZSV at 620 m. Tested same to 105 bar. Commenced displacing well to seawater.

23.05.2004 POOH LD EZSV RT. Pulled WB. RU for pulling BOP. Unlatched BOP.
Pulled riser jewellery. Meanwhile set surface cmt plug and RIH with csg cutting assy and MOST tool to 20 m.

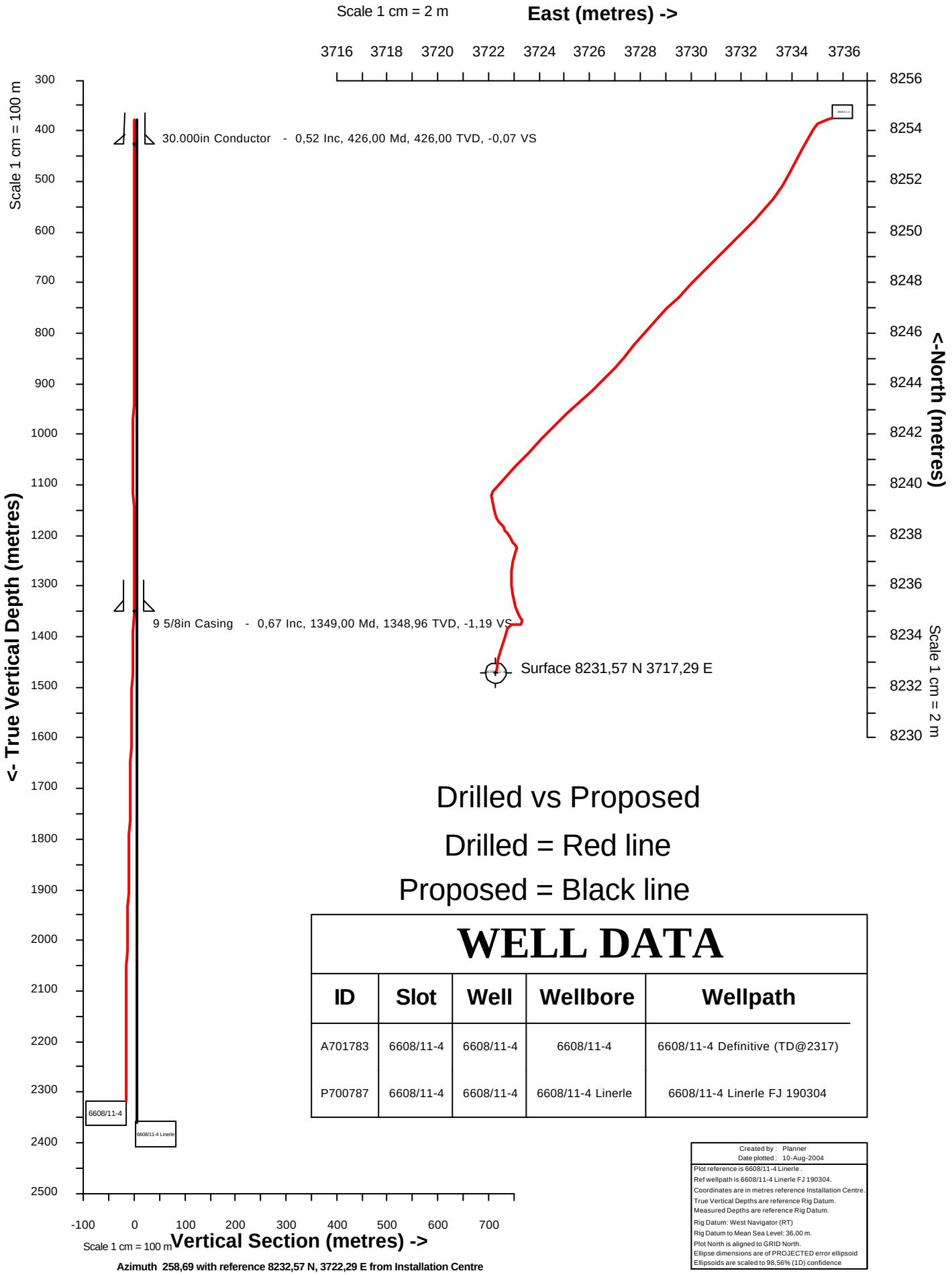
24.05.2004 RIH w/ cutting assembly to 4 m below seabed, cut 20" X 30" casing and retrieved wellhead and casing stump. Continued to pull riser and BOP. Pulled last transponder. Continued offloading bulk and equipment. BOP, riser and hoses secured. Off Linerle location/contract 23.05.2004 @ 23:00 hrs.

App B Directional data, survey listing

B.1 Well plot

Statoil

Location:	**Norway**	**Slot:**	**6608/11-4**
Field:	**EXPLORATION ZONE 32**	**Well:**	**6608/11-4**
Installation:	**6608/11- Exploration**	**Wellbore:**	**6608/11-4 Linerle**



Drilled vs Proposed

Drilled = Red line

Proposed = Black line

WELL DATA

ID	Slot	Well	Wellbore	Wellpath
A701783	6608/11-4	6608/11-4	6608/11-4	6608/11-4 Definitive (TD@2317)
P700787	6608/11-4	6608/11-4	6608/11-4 Linerle	6608/11-4 Linerle FJ 190304

Created by : Planner
Date plotted : 10-Aug-2004

Plot reference is 6608/11-4 Linerle .
Ref wellpath is 6608/11-4 Linerle FJ 190304.
Coordinates are in metres reference Installation Centre.
True Vertical Depths are reference Rig Datum.
Measured Depths are reference Rig Datum.
Rig Datum: West Navigator (RT)
Rig Datum to Mean Sea Level: 36,00 m.
Plot North is aligned to GRID North.
Ellipse dimensions are of PROJECTED error ellipsoid
Ellipsoids are scaled to 98,56% (1D) confidence

B.2 Well survey listing

STATOIL

Statoil,6608/11-4
6608/11- Exploration,6608/11
EXPLORATION ZONE 32,Norway

Wellbore: 6608/11-4
Wellpath: 6608/11-4 Definitive
(TD@2317)
Date Printed: 10-Aug-2004

BAKER HUGHES INTEQ

Wellbore

Name	Created	Last Revised
6608/11-4	5-May-2004	13-Jul-2004

Well

Name	Government ID	Last Revised
6608/11-4		15-Jun-2004

Slot

Name	Grid Northing	Grid Easting	Latitude	Longitude	North	East
6608/11-4	7342390,0000	474330,0000	N66 11 56,2479	E8 25 47,9736	8232,57N	3722,29E

Installation

Name	Easting	Northing	Coord System Name	North Alignment
6608/11- Exploration	470609,156	7334160,635	ED50-UTM-32N on EUROPEAN DATUM 1950 datum	Grid

Field

Name	Easting	Northing	Coord System Name	North Alignment
EXPLORATION ZONE 32	381477,000	7229793,000	ED50-UTM-32N on EUROPEAN DATUM 1950 datum	Grid

Created By

Comments

All data is in Metres unless otherwise stated
Coordinates are from Installation MD's are from Rig and TVD's are from Rig (West Navigator (RT) 36.0m above Mean Sea Level)
Vertical Section is from 8232,57N 3722,29E on azimuth 31,23 degrees
Bottom hole distance is 25,65 Metres on azimuth 31,23 degrees from Wellhead
Calculation method uses Minimum Curvature method
Prepared by Baker Hughes Incorporated

STATOIL

Statoil,6608/11-4
6608/11- Exploration,6608/11
EXPLORATION ZONE 32,Norway

Wellbore: 6608/11-4
Wellpath: 6608/11-4 Definitive (TD@2317)
Date Printed: 10-Aug-2004

BAKER HUGHES INTEQ

Wellpath Report

MD[m]	Inc[deg]	Azi[deg]	TVD[m]	North[m]	East[m]	Dogleg [deg/30m]	Vertical Section[m]
378,00	0,00	0,00	378,00	8232,57N	3722,29E	0,00	0,00
452,60	0,81	8,69	452,60	8233,09N	3722,37E	0,33	0,49
481,90	0,80	18,86	481,89	8233,49N	3722,47E	0,15	0,88
567,80	0,35	22,36	567,79	8234,30N	3722,76E	0,16	1,72
653,00	0,29	108,95	652,99	8234,47N	3723,07E	0,16	2,03
703,90	0,24	47,29	703,89	8234,50N	3723,27E	0,16	2,16
768,20	0,45	331,28	768,19	8234,81N	3723,24E	0,21	2,41
854,90	0,74	349,26	854,88	8235,66N	3722,98E	0,12	3,00
912,70	0,51	358,90	912,68	8236,29N	3722,90E	0,13	3,49
941,40	0,77	358,48	941,38	8236,61N	3722,90E	0,27	3,76
970,20	0,85	19,29	970,17	8237,00N	3722,96E	0,32	4,14
999,00	0,51	18,56	998,97	8237,33N	3723,07E	0,35	4,47
1028,20	0,34	349,98	1028,17	8237,53N	3723,10E	0,27	4,66
1057,70	0,61	312,60	1057,67	8237,73N	3722,97E	0,40	4,76
1085,70	0,35	348,30	1085,67	8237,91N	3722,84E	0,41	4,85
1114,60	0,40	313,20	1114,57	8238,07N	3722,75E	0,24	4,94
1143,80	0,35	344,62	1143,77	8238,22N	3722,65E	0,21	5,02
1171,70	0,37	323,23	1171,67	8238,38N	3722,57E	0,15	5,11
1201,40	0,33	313,92	1201,37	8238,51N	3722,45E	0,07	5,17
1229,90	0,47	322,53	1229,87	8238,66N	3722,32E	0,16	5,23
1258,60	0,35	5,13	1258,57	8238,84N	3722,26E	0,33	5,35
1287,80	0,45	344,00	1287,77	8239,04N	3722,24E	0,18	5,51
1316,80	0,56	345,64	1316,77	8239,29N	3722,17E	0,11	5,68
1346,30	0,61	347,36	1346,26	8239,58N	3722,10E	0,05	5,90
1358,10	1,16	37,58	1358,06	8239,74N	3722,16E	2,29	6,06
1389,80	1,43	44,69	1389,75	8240,27N	3722,63E	0,30	6,76
1415,40	1,46	44,99	1415,35	8240,73N	3723,09E	0,04	7,39
1445,00	1,42	41,26	1444,94	8241,27N	3723,60E	0,10	8,12
1473,90	1,45	43,66	1473,83	8241,81N	3724,09E	0,07	8,83
1503,00	1,39	44,91	1502,92	8242,32N	3724,59E	0,07	9,53
1531,80	1,44	48,08	1531,71	8242,81N	3725,11E	0,10	10,22
1560,40	1,38	48,06	1560,30	8243,28N	3725,63E	0,06	10,89
1589,30	1,23	46,27	1589,19	8243,73N	3726,11E	0,16	11,52
1618,50	1,24	45,11	1618,39	8244,17N	3726,56E	0,03	12,13
1646,80	1,35	42,86	1646,68	8244,63N	3727,01E	0,13	12,76
1674,00	1,09	37,53	1673,87	8245,07N	3727,38E	0,31	13,33
1732,70	1,26	42,51	1732,56	8245,99N	3728,16E	0,10	14,51
1762,20	1,33	41,86	1762,05	8246,48N	3728,61E	0,07	15,17
1789,20	1,34	43,80	1789,05	8246,94N	3729,03E	0,05	15,78
1818,30	1,44	44,38	1818,14	8247,45N	3729,52E	0,10	16,47
1847,10	1,45	44,25	1846,93	8247,97N	3730,03E	0,01	17,18
1877,70	1,55	44,55	1877,52	8248,54N	3730,59E	0,10	17,96
1906,90	1,53	46,94	1906,71	8249,09N	3731,15E	0,07	18,72
1933,60	1,62	46,31	1933,40	8249,59N	3731,69E	0,10	19,43
2022,00	1,39	37,76	2021,77	8251,31N	3733,25E	0,11	21,70
2049,60	1,25	30,64	2049,36	8251,83N	3733,61E	0,23	22,33
2078,90	1,04	27,86	2078,65	8252,34N	3733,89E	0,22	22,92
2139,50	1,06	29,43	2139,24	8253,31N	3734,43E	0,02	24,03
2164,70	0,94	27,18	2164,44	8253,70N	3734,63E	0,15	24,47
2194,40	0,64	33,72	2194,14	8254,06N	3734,84E	0,32	24,87
2223,10	0,45	51,85	2222,84	8254,26N	3735,01E	0,27	25,14
2280,00	0,39	75,39	2279,73	8254,44N	3735,38E	0,10	25,49
2308,60	0,32	71,76	2308,33	8254,49N	3735,55E	0,08	25,62
2317,00	0,32	71,76	2316,73	8254,51N	3735,59E	0,00	25,65

All data is in Metres unless otherwise stated
Coordinates are from Installation MD's are from Rig and TVD's are from Rig (West Navigator (RT) 36.0m above Mean Sea Level)
Vertical Section is from 8232,57N 3722,29E on azimuth 31,23 degrees
Bottom hole distance is 25,65 Metres on azimuth 31,23 degrees from Wellhead
Calculation method uses Minimum Curvature method
Prepared by Baker Hughes Incorporated

STATOIL

Statoil,6608/11-4
6608/11- Exploration,6608/11
EXPLORATION ZONE 32,Norway

Wellbore: 6608/11-4
Wellpath: 6608/11-4 Definitive (TD@2317)
Date Printed: 10-Aug-2004

BAKER HUGHES INTEQ

Hole Sections

Diameter [in]	Start MD[m]	Start TVD[m]	Start North[m]	Start East[m]	End MD[m]	End TVD[m]	End North[m]	Start East[m]	Wellbore
36,000	378,00	378,00	8232,57N	3722,29E	428,00	428,00	8232,81N	3722,33E	6608/11-4
12 1/4	428,00	428,00	8232,81N	3722,33E	1357,00	1356,96	8239,72N	3722,15E	6608/11-4
8 1/2	1357,00	1356,96	8239,72N	3722,15E	2317,00	2316,73	8254,51N	3735,59E	6608/11-4

Casings

Name	Top MD[m]	Top TVD[m]	Top North[m]	Top East[m]	Shoe MD[m]	Shoe TVD[m]	Shoe North[m]	Shoe East[m]	Wellbore
30.000in Conductor	378,00	378,00	8232,57N	3722,29E	426,00	426,00	8232,79N	3722,33E	6608/11-4
9 5/8in Casing	378,00	378,00	8232,57N	3722,29E	1349,00	1348,96	8239,61N	3722,10E	6608/11-4

Survey Tool Program

Reference	Survey Name	MD[m]	TVD[m]	Survey Tool	Error Model
702214	6608/11-4 BHI.MWD 12 1/4" (452-1346)	1346,30	1346,26	Magnetic (MWD, EMS)	MWD, standard, mag-corr
702246	6608/11-4 BHI.MWD 8 1/2" (1358-2308)	2308,60	2308,33	Magnetic (MWD, EMS)	MWD, standard, mag-corr
702589	6608/11-4 Extrapolation (TD@2317)	2317,00	2316,73	Magnetic (MWD, EMS)	MWD, standard, mag-corr

All data is in Metres unless otherwise stated
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Vertical Section is from 8232,57N 3722,29E on azimuth 31,23 degrees
Bottom hole distance is 25,65 Metres on azimuth 31,23 degrees from Wellhead
Calculation method uses Minimum Curvature method
Prepared by Baker Hughes Incorporated

App C List of contractors

SERVICE	COMPANY
Casing	Weatherford
Cementing	Halliburton
Coring	Halliburton
Directional Drilling	Halliburton Sperry Sun
Diving	Oceaneering AS
Drilling Contractor	Smedvig offshore AS
Electric Logging	Schlumberger
Helicopter	Norsk helikopter
Helicopter Booking	Lufttransport (Statoil)
Mud	M-I Norge AS
Mud Logging	Geoservices
MWD	Baker Hughes INTEQ
Wellhead System	ABB Vetco

App D NPD Shallow gas report

1. *Avstand fra boredekk til havnivå:* 36 m

2. *Vanndyp:* 342 m

3a. *Settedyp for lederør:* 426 mRKB

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

4a. *Settedyp for foringsrør hvorpå BOP settes:* 1349 mRKB

4b. *Formasjonstyrketest (g/cc):* 1.55 g/cc

5. *Dyp (mRKB og TVG) til formasjon-/ledd-/lagtopper:*

Topp Naust Fm (base Quaternary): 682mRKB, 770 msTVG

Topp Kai Fm: 1389.5 mRKB, 1380 msTVG

Topp Brygge Fm (topp Hordaland Gp): 1433.5 mRKB, 1450msTVG

6. *Dybdeintervall (mRKB og TVG) og alder for sandlag grunnere enn 1000 m under havbunnen:*

Ingen sandlag påvist (ingen retur av borekakst i dette intervallet)

7. *Oppgi hvilke lag som evt. inneholder gass.*

Ingen gass påvist

8. *Sammensetning og opprinnelse til gassen:* Ingen gass påvist

9. *Beskriv alle målinger i gassførende lag:* Ingen gass påvist

10. *Angi dyp (mRKB og TVG) til inkonformiteter i borehullsposisjonen:* Mulig inkonformiteter i den kvartære lagpakken, men dette er ikke påvist.

11. *Angi utbredelsen av sandlagene (kommunikasjon, kontinuitet, trunkering, etc.):* Ingen sandlag identifisert.

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

13. *Angi eventuell seismiske indikasjoner på at gassen stammer fra dypere nivå:* Ingen gass påvist

Beskrivelse dersom gassen stammer fra dypere nivå: Ingen gass

14. *Hvordan samsvarer tolkingen av borestedsundersøkelsen med borehullsdata mht. :*

- *grunn gass:* Ingen grunn gass prognosert. Ingen grunn gass observert.
- *sandlag:* Prognosert sandlag i intervallene 577-592 mRKB og 649-678 mRKB. Sandlag er ikke påvist i første intervall, men mulig sandig seksvens kan være tilstede i intervallet 643-667m
- *inkonformiteter:* Ikke mulig å påvise.

- korrelasjon til nærliggende borehull: Mulig korrelasjon mot flere nærliggende borehull.

7 Enclosure

7.1 Wellsite sample descriptions

7.2 Conventional core descriptions

7.3 Composite log (Statoil)

7.4 Formation evaluation log (Geoservices)

STATOIL

WELLSITE SAMPLE DESCRIPTION				Page 1 of 11
Country: Norway	Area: North Sea		Field: Linerle	
Well no: 6608/11-4	Company: Statoil ASA, Petoro AS, Norsk Hydro ASA, ENI Norge A/S, AS Norske Shell			
RKB: 36 meters	Geologist: P. Sergeant. Ø. Hovden. S. Renshaw			
Hole size: 8 ½"	Cut solvent: Iso Propyl Alcohol		Date: 12.05.2004	

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.
		Samples returned to seabed down to 1357m	
1360	100 CMT		
1370	90 CMT		
	10 Clst	Med gry, sft – frm, slily calc, slily – mod slty, slily – v sdy, mod micromic, Tr micropyr, Tr blk mafic grs, R glauc, Tr floating grs (?) of v crs – gran sized, ang frags, crys qtz & gabbro?, mafic grs, R phyllite frag	
1380	10 CMT		
	90 Clst	a.a., occ olv gry, grds to Tr arg v f Sst	
1390	100 Clst	a.a	
1400	100 Clst	a.a	
1410	100 Clst	a.a	
1420	100 Clst	a.a	
1430	100 Clst	a.a	
1440	100 Clst	a.a, also gd tr glauc grns	
1450	100 Clst	a.a, occ slty w/glauc grns	
1460	50 Clst	a.a	
	50 Slts	Brn gry, sft, subblky, grdg clst, non calc, v abund glauc grns	
1470	30 Clst	a.a	
	70 Sltst	a.a but also grdg vf arg sd	
1480	30 Clst	a.a	
	70 Sltst	a.a	
1490	60 Sltst	a.a	
	40 Clst	Pl yel grn, lt bl grn, sft-frm, blky, flky, non calc	
1500	90 Clst	a.a	
	10 Sltst	a.a	
1510	90 Clst	a.a	
	10 Sltst	a.a	
1520	90 Clst	a.a	
	10 Sltst	a.a	
1530	90 Clst	Pl yel grn, a.a	
	10 Clst	Lt brn gry, frm, blky, occ glauc, v calc, occ slty	
	Slt tr Sd	Qtz gren, v crs, ang-subrnd	
	Slt tr Pyr	Mass microxln, also incl in clst	

Country: Norway	Area: North Sea	Field: Linerle
Well no: 6608/11-4	Company: Statoil ASA, Petoro AS, Norsk Hydro ASA, ENI Norge A/S, AS Norske Shell	
RKB: 36 meters	Geologist: P. Sergeant. Ø. Hovden. S. Renshaw	
Hole size: 8 ½"	Cut solvent: Iso Propyl Alcohol	Date: 12.05.2004

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.
1540	70	Clst	Lt bl grn, , sft-frm, sft-frm, blky, non calc
	30	Clst	Lt brn-olv gry, firm, blky, non-occ sl calc, occ slty
1550	80	Clst	Lt brn, olv gry, a.a
	20	Clst	Lt bl grn
	Gd tr	Lst	Grnsh wh, lt gry, blky, hd – frm, occ v arg, occ v slty, occ v sndy
1560	100	Clst	Lt brn, olv gry, a.a
	Gd tr	Clst	Lt bl grn, a.a
	Tr	Lst	a.a
1570	100	Clst	Lt brn, olv gry, a.a
	Gd tr	Clst	Lt bl grn, a.a
	Tr	Lst	a.a
1580	50	Clst	Lt brn, olv gry, a.a
	50	Clst	Lt bl grn, a.a
1590	80	Clst	Lt bl grn, a.a
	20	Clst	Lt brn, olv gry, a.a
1602	80	Clst	Lt gry, grnsh gry, frm-fri, blky, non calc
	20	Clst	Lt bl grn, a.a
1605	90	Clst	Lt gry, grnsh gry, a.a
	10	Clst	Lt bl grn, a.a
1608	90	Clst	Lt gry, grnsh gry, a.a
	10	Clst	Lt bl grn, a.a
1611	90	Clst	Lt gry, grnsh gry, a.a
	10	Clst	Lt bl grn, a.a
1614	90	Clst	Lt gry, grnsh gry, a.a
	10	Clst	Lt bl grn, a.a
	Gd tr	Lst	a.a
1617	90	Clst	Lt gry, grnsh gry, a.a
	10	Clst	Lt bl grn, a.a
	Gd tr	Lst	a.a
1623	90	Clst	Lt gry, grnsh gry, olv gry a.a
	10	Clst	Lt bl grn, a.a
	Gd tr	Lst	a.a
1632	100	Clst	Grnsh gry, olv gry w/tr pyr and glauc grns, else a.a
1635	100	Clst	a.a
1638	100	Clst	a.a
1641	100	Clst	a.a

WELLSITE SAMPLE DESCRIPTION				Page 3 of 11
Country: Norway	Area: North Sea		Field: Linerle	
Well no: 6608/11-4	Company: Statoil ASA, Petoro AS, Norsk Hydro ASA, ENI Norge A/S, AS Norske Shell			
RKB: 36 meters	Geologist: P. Sergeant. Ø. Hovden. S. Renshaw			
Hole size: 8 ½"	Cut solvent: Iso Propyl Alcohol		Date: 12.05.2004	

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.
1644	100 Clst	Olv gry, grnsh gry, firm, blky, non-occ sl calc, occ slty w/tr pyr and glauc grns	
1647	100 Clst	a.a	
1650	70 Clst	Olv gry, grnsh gry, a.a, also occ med dk gry, occ v glauc	
	30 Clst	Lt bl grn, , sft-frm, sft-frm, blky, non calc	
1653	100 Clst	Olv gry, grnsh gry, sft-frim homog, blky, occ grdg siltst/vf , sft, arg sst	
1656	100 Clst	a.a	Br yel fluor, v sl stmng -cldy bl wh cut fluor in sltst frag
1659	70 Clst	Gen a.a. (but increase in vf , sft, arg sst)	
	30 Clst	Blk, hd, blky, grdg arg coal	
	Tr Slts/sst	Lt gry, vf , sft, arg sst	Shows: a.a , but more abundant in sample
1662	90 Clst	Olv gry, grnsh gry amor/sft, a.a	Poor sample
	10 Clst	Blk, hd, a.a	
	Gd tr Sst	I.P. lse qtz, occ clr – trnsl, dom off wh – lt brn opq, v f – f, wl srt, ang – sbrndd, Gd Tr lse Mic & Pyr, Tr lse Glauc, I.P. small Sst frags, pa – lt brn – grysh brn, v f – fn, slty I.P., wl srt, ang – sbrndd, fri – mod hd, slily – v calc, slily dol, slily mic, tr micropyr, Tr carb incls, pr – gd vis por	Fr O.S., pa – lt brn stn, mod bri – bri yel – yel gold fluor, fr strm cut, fr blu wh wh solv fluor, fr yel wh resid fluor, occ Tr yel brn ring resid
	Tr Sltst	Pa – lt brnsh gry, sft – frm, Tr – slily calc, slily dol I.P., mod – v arg, sdy I.P., slily – occ mod micromic, Tr – slily carb, no vis por	Pr O.S., mod bri – bri yel gold fluor, pr strm cut, pr blu wh solv fluor, pr – fr yel wh resid fluor, no ring resid
		Core no. 1 and 2: 1662-1714m	
1716	50 Clst	Pl grn, blky, hd-frm, non calc	Poor sample quality
	50 Clst	Dk grnsh gry, gen blky, sft-frm-hd, non calc	
	Gd tr Coal	Blk, brtl, occ sl arg, occ sl calc	
1719	35 Clst	Dk grnsh gry, a.a	a.a
	25 Clst	Pl grn, a.a	
	25 Coal	a.a	
	15 Sst	Fn-crs qtz grns, clr-trnsl, only lse grns	No shows
1725	a.a		Poor sample quality(clays washed away, sand overrepresented?)
1731	60 Sst	a.a	a.a
	20 Clst	Dk grnsh gry, a.a	
	20 Clst	Pl grn, a.a	

STATOIL

WELLSITE SAMPLE DESCRIPTION				Page 4 of 11
Country: Norway	Area: North Sea		Field: Linerle	
Well no: 6608/11-4	Company: Statoil ASA, Petoro AS, Norsk Hydro ASA, ENI Norge A/S, AS Norske Shell			
RKB: 36 meters	Geologist: P. Sergeant. Ø. Hovden. S. Renshaw			
Hole size: 8 ½"	Cut solvent: Iso Propyl Alcohol		Date: 12.05.2004	

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.
1734	a.a				Poor sample quality(clays washed away, sand overrepresented?)
1740	80	Sst	Fn-crs qtz grns, clr-trnsl, only lse grns		a.a., no shows
	10	Clst	Pl grn, blky, hd-frm, non calc		
	10	Clst	Dk grnsh gry, gen blky, sft-frm-hd, non calc		
	Tr	Clst	Pl grn		
1746	a.a				a.a
1752	a.a				
	tr	pyr	Mas, microxln		a.a
1758	70	Sst	Gen vfn-med, les qtz grns, rnd-sbrnd		a.a
	10	Clst	Lt grn, a.a		
	10	Clst	Lt gry, sft, amor, slty, sndy		
	10	Pyr	Mass, mcroxln, occ blky		
1764	90	Sst	Gen vfn-crs, les qtz grns, rnd-sbrnd, mica		a.a
	10	Clst	Mix of Lt grn, a.a and lt gry a.a		
	Gd tr	Pyr	a.a		
1770	70	Clst	Lt gry, yelish lt gry, occ wh (kaol?), sft-amor, sndy, occ dk spks occ sl calc		a.a
	30	Sst	a.a		
	Gd tr	Pyr	a.a		
1776	70	Clst	a.a		a.a
	10	Sst	a.a		
1782	60	Clst	a.a		a.a
	40	Sst	a.a		
1788	100	Sst	a.a		a.a
	Gd tr	Clst	a.a		
1794	60	Sst	a.a		a.a
	40	Clst	a.a		
	Gd tr	Clst	Pl grn, blky, hd-frm, non calc		
1800	80	Sst	a.a		a.a
	20	Clst	Lt gry, a.a		
	Tr	Clst	Pl grn, a.a		
1806	70	Sst	a.a		a.a
	30	Clst	Lt gry, a.a		
	Tr	Clst	Pl grn, a.a		
1812	60	Sst	a.a		a.a.
	30	Clst	Lt gry, a.a		
	10	Coal	Blk, frm-hd, occ brtl, blky, occ arg, occ grdg v carb clst		

STATOIL

WELLSITE SAMPLE DESCRIPTION				Page 5 of 11
Country: Norway	Area: North Sea		Field: Linerle	
Well no: 6608/11-4	Company: Statoil ASA, Petoro AS, Norsk Hydro ASA, ENI Norge A/S, AS Norske Shell			
RKB: 36 meters	Geologist: P. Sergeant. Ø. Hovden. S. Renshaw			
Hole size: 8 ½"	Cut solvent: Iso Propyl Alcohol		Date: 12.05.2004	

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.
1818	70 Clst	Lt gry – lt olv gry, occ wh, v sft & amorph, stky, sdy(?), non calc, grds arg Sst (?)	Snd appears to stick onto clay on shakers
	10 Sst	Lse qtz, clr – trnsl, vf – crs, ang - sbrndd	
	10 Coal	Dk brn – blk, frm – hd, brit I.P., occ arg, occ grd carb Clst	
	10 Clst	Lt – pa gn, hd blky, occ dk gn spk, non calc, splnty	
	Gd Tr Mic		
1824	70 Sst	a.a.	Poor samp., no shows
	20 Clst	a.a.	
	10 Coal	a.a.	
	Tr Mic		
	Tr Pyr		
1830	100 Sst	Lse qtz, clr – trnsl, Tr off wh opq, R rd stn, f – med – tr crs, mod – wl srt, ang – rndd, dom subang – sbrndd, Gd Tr lse Mic, Tr lse Pyr	No shows
	Tr Clst	a.a.	
	Tr Coal	a.a.	
1842	70 Clst	Med dk brn – brnsh blk, sft – frm, Tr v frm, non calc, mod – v carb, grds Occ Coal	
	10 Coal	Blk, frm – brit, Tr woody, ethy I.P., shny I.P., arg I.P., grds carb Clst	
	20 Sst	a.a.Tr wh – off wh kao (?) mtx	
	Tr Clst	Sft, a.a.	
1848	80 Sst	A.a., fn – med – Tr crs	Tr lt – med gry & lt gry Gn clst cvgs. No shows
	20 Clst	Carb a.a.	
	Tr Clst	Sft, a.a.	
1854	70 Sst	a.a.	Tr cvgs a.a.. No shows
	10 Coal	a.a.	
	20 Clst	Lt brnsh gry, v sft & amorph, Tr wh kao (?), non calc, slty I.P., sdy I.P., micromic, Tr – slily microcarb	Sd com mixes w/ clst Over shakers
1860	80 Clst	a.a., sft	Continuous trace Cvgs a.a.
	20 Sst	a.a.	
	Tr Coal	a.a., gds carb clst	
1866	40 Coal	Blk, frm – brit, Tr woody, ethy I.P., shny I.P., arg I.P., grds carb Clst	
	50 Clst	Sft, a.a.	
	10 Sst	a.a.	
1872	60 Clst	Sft, a.a., also loc tr w/ abd glauc gr	
	20 Coal	a.a., gds carb clst	
	20 Sst	a.a.	
1878	70 Sst	Lse qtz, clr – trnsl, Tr off wh opq, v f – crs, pr srt, ang – rndd, dom Sbang – sbrndd, Gr Tr lse Mic, R lse Pyr	
	20 Clst	Sft, a.a.	
	10 Coal	a.a., gds carb clst.	

WELLSITE SAMPLE DESCRIPTION				Page 6 of 11
Country: Norway	Area: North Sea		Field: Linerle	
Well no: 6608/11-4	Company: Statoil ASA, Petoro AS, Norsk Hydro ASA, ENI Norge A/S, AS Norske Shell			
RKB: 36 meters	Geologist: P. Sergeant. Ø. Hovden. S. Renshaw			
Hole size: 8 ½"	Cut solvent: Iso Propyl Alcohol		Date: 12.05.2004	

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.
1884	60 Clst	Sft, a.a.	Cont. Tr cvgs a.a.
	40 Sst	a.a.	No shows
	Tr Coal	a.a.	
1890	30 Clst	Sft, a.a.	
	70 Sst	Lse qtz, clr – occ trnsl, Tr off wh opq, v f – f – occ med – Tr crs, pr – mod srt, ang – dom subang – rndd, Tr lse Mic	No shows
	Tr Coal	a.a.	
1896	60 Sst	a.a., v f – med – occ crs, pr srt	No shows
	40 Clst	Pa – dom ly – occ med brnsh gry, v sft & amorph, non calc, micromic, slily – mod slty, Tr microcarb, (sd gr on sample prob due to mixing of cly & sd over shakers)	
	Tr Coal		
1908	30 Clst	a.a.	
	70 Sst	a.a.	No shows
	Tr Dol	Brn – grysh brn – or brn, hd, micrxln, v arg, grds dol mrl (only found as small frags)	
	Tr Ls	Wh – off wh, pr – mod ind, micr I.P., microxln I.P., v dol, arg	
	Tr Coal	a.a.	
1914	50 Clst	a.a.	
	50 Sst	a.a.	No shows
	Gd Tr Ls	a.a.	
	Tr Coal	a.a.	
1920	50 Clst	a.a.	
	50 Sst	a.a.	No shows
	R Ls	a.a.	
	Tr Coal	a.a.	
	Tr Dol	Small frags a.a.	
1926	90 Sst	a.a.	No shows
	10 Clst	a.a.	
	Tr Coal	a.a.	
1938	60 Sst	a.a.	No shows
	20 Clst	a.a.	
	20 Coal	Grd carb Clst a.a.	
	R Ls	a.a.	
1944	60 Sst	a.a., v f – crs – Tr v crs	No shows
	20 Clst	a.a.	
	20 Coal	Grd carb Clst a.a.	
1950	50 Sst	a.a.	No shows
	20 Coal	Grd carb Clst a.a.	
	30 Clst	Tr – occ off wh (kao?), dom pa – lt – occ med dk brnsh gry, v sft & amorph, dispersive, slily – dom mod slty, Tr – slily microcarb, Tr – slily micromic, (embed sd gr prob due to mixing on shakers)	

STATOIL

WELLSITE SAMPLE DESCRIPTION					Page 7 of 11
Country: Norway		Area: North Sea		Field: Linerle	
Well no: 6608/11-4		Company: Statoil ASA, Petoro AS, Norsk Hydro ASA, ENI Norge A/S, AS Norske Shell			
RKB: 36 meters		Geologist: P. Sergeant. Ø. Hovden. S. Renshaw			
Hole size: 8 ½"		Cut solvent: Iso Propyl Alcohol		Date: 12.05.2004	

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.
1956	60	Clst	a.a.	
	30	Coal	Grd carb Clst a.a.	
	10	Sst	a.a.	
1962	60	Clst	a.a.	
	30	Carb Clst	Med dk brn – brnsh blk, frm – v frm, non calc, mod – v carb, Tr – slily micromic, grds Coal, blk, mod hd – hd & brit, shny I.P., ethy & arg I.P., Tr Pyr	
	10	Sst	a.a.	
1974	80	Clst	a.a.	
	10	Carb Clst	a.a.	
	10	Sst	a.a.	
			Samples missing due to lunch	
2004	60	Clst	a.a.	
	10	Carb Clst	a.a.	
	30	Sst	Lse qtz, clr – occ trnsl, occ off wh – pa gry opq, r rd stn, v f – crs – Tr v crs, pr srt, sbang – rndd, R lse Mic & Pyr	No shows
2010	60	Clst	a.a.	
	40	Sst	a.a.	No shows
	Tr	Carb Clst	a.a.	
2016	70	Clst	a.a.	
	30	Sst	a.a.	No shows
	Tr	Carb Clst	a.a.	
	Tr	Dol	Pa – med grysh brn – olv brn, mod – wl ind, micr I.P., microxln I.P., calc, v arg	
2022	90	Clst	a.a.	
	10	Sst	a.a.	
	Tr	Carb Clst	a.a.	
	Tr	Dol	a.a.	
2028	50	Clst	a.a.	
	20	Carb Clst	a.a.	
	30	Sst	a.a.	
	Tr	Dol	a.a.	
2034	50	Clst	a.a.	
	30	Carb Clst	a.a.	
	20	Sst	a.a.	
2040	70	Clst	a.a.	
	20	Carb Clst	a.a., incr grds to Coal	
	10	Sst	a.a.	
2046	70	Clst	a.a.	
	10	Carb Clst	a.a.	
	20	Sst	a.a.	

WELLSITE SAMPLE DESCRIPTION				Page 8 of 11
Country: Norway	Area: North Sea		Field: Linerle	
Well no: 6608/11-4	Company: Statoil ASA, Petoro AS, Norsk Hydro ASA, ENI Norge A/S, AS Norske Shell			
RKB: 36 meters	Geologist: P. Sergeant. Ø. Hovden. S. Renshaw			
Hole size: 8 ½"	Cut solvent: Iso Propyl Alcohol		Date: 12.05.2004	

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.
2052	80	Clst	a.a.
	20	Sst	Loc clr – trnsl, Tr off wh opq, v f – dom f – med – Tr crs, pr - mod srt, sbang – rndd, Tr lse Pyr
	Tr	Carb Clst	a.a.
2058	50	Clst	a.a.
	50	Sst	V f – crs – Tr v crs as at 2004m
	Tr	Carb Clst	a.a.
2064	60	Sst	a.a.
	40	Clst	a.a.
	Gd Tr	Carb Clst	a.a., Tr bcm dk gry
2070	70	Clst	a.a.
	30	Sst	a.a.
	Tr	Carb Clst	a.a.
2076	60	Clst	a.a.
	40	Sst	a.a.
	Tr	Carb Clst	a.a.
	R	Dol	a.a.
2082	60	Sst	a.a.
	40	Clst	a.a.
	Gd Tr	Carb Clst	a.a.
	Gd Tr	Dol	Off wh – pa brn, pr – wl ind, micr I.P., micro – v f xln I.P., mod calc, slily mic I.P.
2088	70	Sst	a.a.
	10	Carb Clst	a.a.
	20	Sst	a.a.
2094	60	Sst	a.a.
	30	Clst	a.a.
	10	Dol	Off wh – pa brn, dom sft – occ mod ind, dom micr, occ micro – v f xln, Slily calc, Tr mic, arg
	Gd Tr	Carb Clst	a.a.
2100	70	Sst	a.a. (no-sl tr pyr)
	30	Clst	a.a.
	Tr	Dol	a.a.
	Tr	Carb Clst	a.a.
2106	40	Sst	a.a.
	50	Clst	a.a.
	Tr	Dol	a.a.
	10	Carb Clst	a.a.
2112	60	Sst	a.a.
	40	Clst	a.a.
	Tr	Dol	a.a.
	Tr	Carb Clst	a.a.

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WELLSITE SAMPLE DESCRIPTION				Page 9 of 11
Country: Norway	Area: North Sea		Field: Linerle	
Well no: 6608/11-4	Company: Statoil ASA, Petoro AS, Norsk Hydro ASA, ENI Norge A/S, AS Norske Shell			
RKB: 36 meters	Geologist: P. Sergeant. Ø. Hovden. S. Renshaw			
Hole size: 8 ½"	Cut solvent: Iso Propyl Alcohol		Date: 12.05.2004	

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.
2118	60	Sst	a.a.	Poor sample quality. Clst dissolves
	40	Clst	a.a.	
	Tr	Dol	a.a.	
	Tr	Carb Clst	a.a.	
2124	60	Sst	a.a.	a.a
	40	Clst	a.a.	
	Tr	Dol	a.a.	
	Tr	Carb Clst	a.a.	
2130	70	Sst	a.a	a.a
	30	Clst	a.a	
	Tr	Carb Clst	a.a	
2136	70	Sst	a.a	a.a
	30	Clst	a.a	
	Tr	Carb Clst	a.a	
2148	100	Sst	a.a	a.a
	Tr	Clst	a.a	
	Tr	Carb clst	a.a	
2154	100	Sst	a.a	a.a
	Tr	Clst	a.a	
	Tr	Carb clst	a.a	
2160	100	Sst	a.a	a.a
	Tr	Clst	a.a	
	Tr	Carb clst	a.a	
2172	100	Sst	a.a	a.a
	Tr	Clst	a.a	
	Tr	Carb clst	a.a	
2184	100	Sst	a.a	a.a
	Tr	Clst	a.a	
	Gd tr	Lst	Wh, lt gry, sft-frm, occ w blk stks/spks, -sft, occ sndy, occ arg, microxln	
2190	100	Sst	a.a	a.a
	Tr	Clst	a.a	
	Gd tr	Lst	a.a	
2196	100	Sst	a.a	a.a
	Tr	Clst	a.a	
	Gd tr	Lst	a.a	
2196	100	Sst	a.a, but also tr mica	a.a
	Tr	Clst	a.a	
	Gd tr	Lst	a.a	

STATOIL

WELLSITE SAMPLE DESCRIPTION				Page 10 of 11
Country: Norway	Area: North Sea		Field: Linerle	
Well no: 6608/11-4	Company: Statoil ASA, Petoro AS, Norsk Hydro ASA, ENI Norge A/S, AS Norske Shell			
RKB: 36 meters	Geologist: P. Sergeant. Ø. Hovden. S. Renshaw			
Hole size: 8 ½"	Cut solvent: Iso Propyl Alcohol		Date: 12.05.2004	

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.
2202	60 Sst	Clr – trnsl, Tr off wh opq, v f – dom f – med – occ tr crs, pr - mod srt, sbang – rndd, no cmt, tr lse mica	a.a
	30 Clst	Tr – occ off wh (kao?), dom pa – lt – occ med dk brnsh gry, v sft & amorph, dispersive, slily – dom mod slty, Tr – slily microcarb, Tr – slily micromic, (embed sd gr prob due to mixing on shakers	
	10 Lst	Wh, lt gry, sft-frm, occ w blk stks/spks, -sft, occ sndy, occ arg, microxln	
2208	60 Sst	a.a	a.a
	30 Clst	a.a	
	10 Lst	a.a	
2214	60 Sst	a.a	a.a
	30 Clst	a.a	
	Tr Lst	a.a	
2220	50 Sst	a.a	a.a
	30 Clst	a.a	
	20 Lst	a.a	
	Sl tr Clst	Rd brn, sft, blky, slty occ sl sndy,	Only few cuttings
2226	40 Clst	Mod rd brn-mod orng pnk, blky, sft-frm, gen non to v calc, occ slty	
	40 Clst	Multiclrd, a.a	
	10 Sst	a.a	
	10 Lst	a.a	
2232	80 Sst	a.a	
	10 Clst	Rd brn, a.a	
	10 Clst	Multiclrd, a.a	
	Gd tr Lst	a.a	
2244	40 Sst	a.a	
	20 Clst	Rd brn, a.a	
	30 Clst	Multiclrd, a.a	
	10 Lst	a.a	
2250	70 Sst	a.a	
	10 Clst	Rd brn, a.a	
	10 Clst	Multiclrd, a.a	
	10 Lst	a.a	
2256	50 Sst	a.a	
	20 Clst	Multiclrd, a.a	
	20 Lst	a.a	
	10 Clst	Rd brn, a.a	
2262	40 Sst	a.a	
	30 Clst	Multiclrd, a.a	
	30 Lst	a.a	
	Tr Clst	Rd brn, a.a	

STATOIL

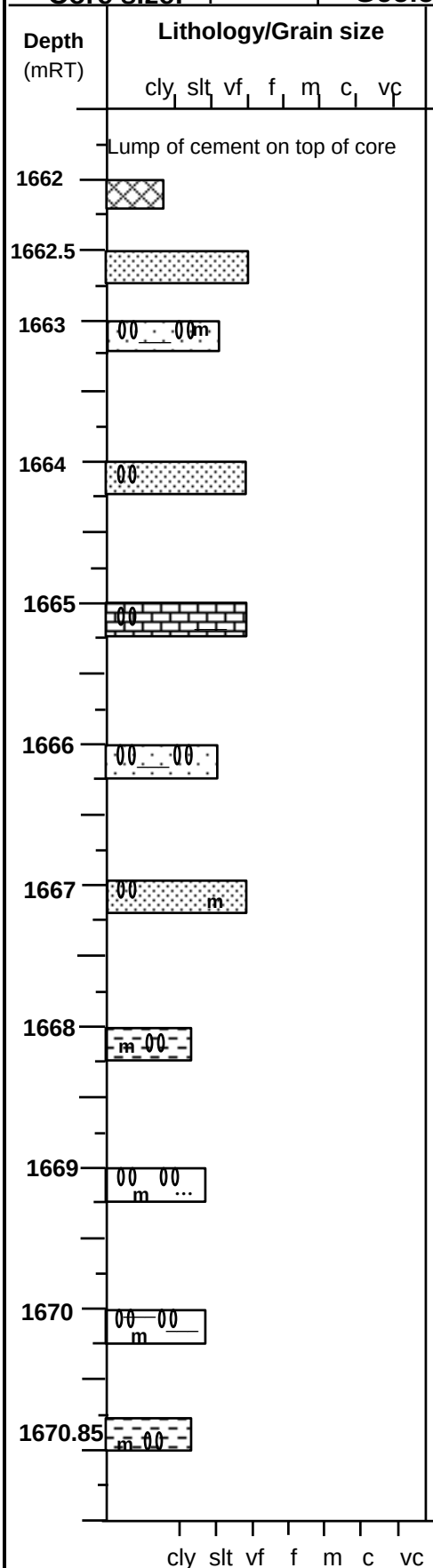
WELLSITE SAMPLE DESCRIPTION				Page 11 of 11
Country: Norway	Area: North Sea		Field: Linerle	
Well no: 6608/11-4	Company: Statoil ASA, Petoro AS, Norsk Hydro ASA, ENI Norge A/S, AS Norske Shell			
RKB: 36 meters	Geologist: P. Sergeant. Ø. Hovden. S. Renshaw			
Hole size: 8 ½"	Cut solvent: Iso Propyl Alcohol		Date: 12.05.2004	

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.
2268	40 Sst	a.a	
	30 Clst	Multiclrd, a.a	
	30 Lst	a.a	
	Tr Clst	Rd brn, a.a	
2274	30 Clst	Multiclrd, a.a	
	30 Clst	Rd brn, a.a	
	30 Sst	a.a	
	10 Lst	a.a	
	Tr Pyr		
2280	40 Clst	Multiclrd, a.a	
	30 Clst	Rd brn, a.a	
	20 Sst	a.a	
	10 Lst	a.a	
2286	90 Clst	Multiclrd, med lt – med brn – rdsh brn – Tr purp brn, pa – med gry – occ purp gry & grnsh gry, R yelsh brn, sft – dom frm, mod – v calc, Tr - slily micromic, non – slily slty	Tr lt gry gn clst cvgs
	10 Sst	a.a.	
	Tr Ls	a.a.	
2292	100 Clst	a.a., bcm dom brn – rdsh brn	a.a.
	Gd Tr Sst	a.a.	
	Tr Ls	a.a.	
2298	100 Clst	a.a.	a.a.
	Tr Sst	a.a.	
	Tr Ls	a.a.	
2304	100 Clst	a.a.	a.a.
	Tr Sst	a.a.	
	Tr Ls	a.a.	
2310	100 Clst	a.a.	a.a.
	Tr Sst	a.a.	
	Tr Ls	a.a.	
2317	100 Clst	a.a.	a.a.
	Tr Sst	a.a.	
	Tr Ls	a.a.	

TD 2317m reached 14:00hrs 12.05.04

CONVENTIONAL CORE DESCRIPTION

Country: Norway	**Area:** Norwegian Sea	**Field:** Linerle Prospect
Well no: 6608/11-4	**Formation:** Åre Fm.	
Core no: 1	**Interval:** 1662 - 1688 m MD	**Cored:** 26 m **Rec:** 18.95 m 72.9 %
Core size: 4"	**Geologists:** P.Sergeant	**Date:** 10.05.04



Depth (mRT)	Shows: STAIN	Shows: FLUOR	Shows: CUT	Shows: POOR	Shows: FAIR	Shows: GOOD	Lithological Description (Rock name, mod. lith., colour, grain size, sorting, roundness, matrix, cementation, hardness, sed. struct., accessories, fossils, porosity, contamination)	Remarks (Shows, etc.)
1662								Sli HC odour, dk brn stn, even dull – mod bri brnsh yel dir fluor, fr bl wh strmg cut fluor, gd bl wh solv fluor, gd bri wh – slily yelsh wh resid fluor, fr yelsh brn ring resid
1662.5	■	■	■			■	**SST:** med dk brn, spkld off wh – pa brn, sft – fri, v f, wl srt, ang – sbrndd, no cmt, Gd Tr blk lith/mafic gr, Tr Mic, R micropyr, v gd vis por	
1663	■	■	■			■	**SLTST:** med brn, spkld off wh, sft – fri, non calc, slily arg, mod – v sdy, slily – mod micromic, slily micropyr, gd por	Shows: a.a., pr strm cut
1664	■	■	■			■	**SST :** med dk brn, spkld off wh – pa brn, fri, slily dol, v f, slily slty, wl srt, ang – sbrndd, Gd Tr blk lith/mafic gr, Tr mMic, R micropyr, v gd por	Shows: a.a.
1665							**LS :** mott lt – med gry, tr blk spk, hd, f – med xln, mod slty, slily arg, slily sdy, slily mic, slily micropyr, occ blk lith/mafic gr, no vis por	No Shows
1666	■	■	■			■	**SLTST :** med dk brn, v sdy, else a.a.	Shows: a.a.
1667	■	■	■			■	**SST :** slily mic, v slily dol, else a.a. at 1664m	Shows: a.a.
1668							**CLST :** dk brnsh gry, crmb, non calc, v micromic, slily slty, slily micrcarb	No Shows
1669	■	■	■		■		**SLTST :** med – med dk grysh brn, sft – fri, slily arg, Tr dol, slily sdy, slily – mod micromic, Tr micropyr, fr vis por	Fr O.S. Sli H.C. odour, med dk brn stn, even dull – mod bri brnsh yel fluor, pr strm cut, ft bl wh solv fluor, fr bri wh – slily yel wh resid fluor, pr – fr yel brn ring resid
1670							**SLTST :** med gry, fri, v arg, non calc, mod micromic, slily microcarb, no vis por	No Shows
1670.85							**CLST :** med dk gry, crmb, non calc, v micromic, slily slty, slily micrcarb	

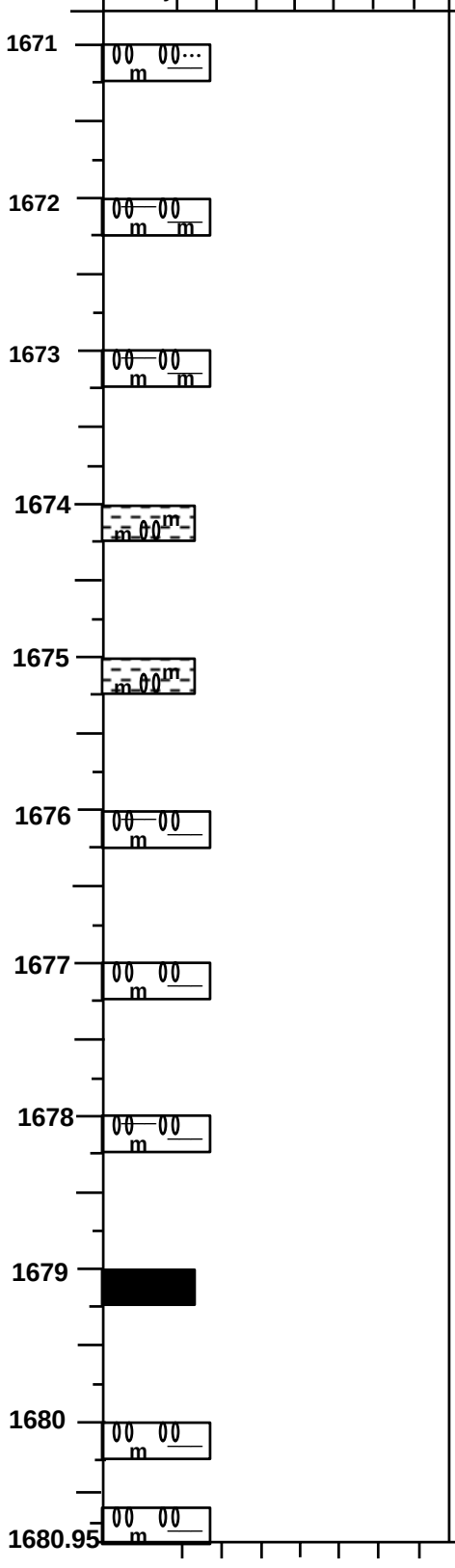
CONVENTIONAL CORE DESCRIPTION

Country: Norway | **Area:** Norwegian Sea | **Field:** Linerle Prospect

Well no: 6608/11-4 | **Formation:** Åre Fm.

Core no: 1 | **Interval:** 1662 - 1688 m MD | **Cored:** 26 m **Rec:** 18.95 m 72.9 %

Core size: 4" | **Geologists:** P.Sergeant | **Date:** 10.05.04

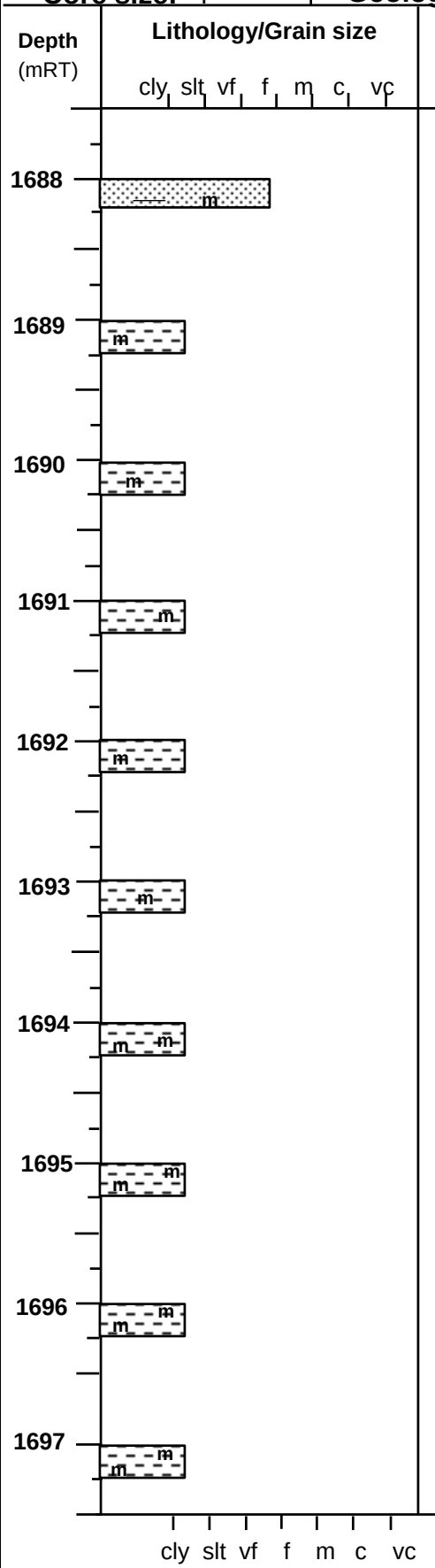


Base of core: 1680.95 m

Shows						Lithological Description	Remarks
STAIN	FLUOR	CUT	POOR	FAIR	GOOD	Rock name, mod. lith., colour, grain size, sorting, round-ness, matrix, cementation, hardness, sed. struct., accessories, fossils, porosity, contamination	Shows, etc.
■	■	■		■		**SLTST :** ptchy med dk gry & med dk grysh brn, crmb, non calc, ptchy v arg & sli arg/slily sdy, mod – v micromic, slily microcarb, ptchy no vis – pr por	Ptchy Fr O.S. a.a.
						SLTST : med dk gry – brnsh gry, crmb, non calc, v arg, v micromic, slily microcarb, Tr micropyr, no vis por	No shows
						SLTST : med dk – dk gry – brnsh gry, else a.a.	No shows
						CLST : dk gry – brnsh gry, crmb – frm, non calc, slily – mod slty, v micromic, slily microcarb	No shows
						CLST : a.a.	No shows
						SLTST : med – med dk gry, crmb, non calc, mod – v arg, Tr sd, mod micromic, slily microcarb, no vis por	No shows
			■			**SLTST :** med gry, crmb, non calc, slily - mod arg, Tr sd, mod micromic, slily microcarb, no vis - pr por	No shows
						SLTST : med – med dk gry, crmb, non calc, v arg, mod micromic, slily microcarb, no vis por	No shows
						COAL : blk, frm – brit, ptchy ethy & shny, arg l.P., v pyr lam, grds carb clst	No shows
			■			**SLTST :** med lt– med gry, crmb, non calc, mod arg, mod micromic, slily microcarb, R micropyr, no vis – pr por	No shows

CONVENTIONAL CORE DESCRIPTION

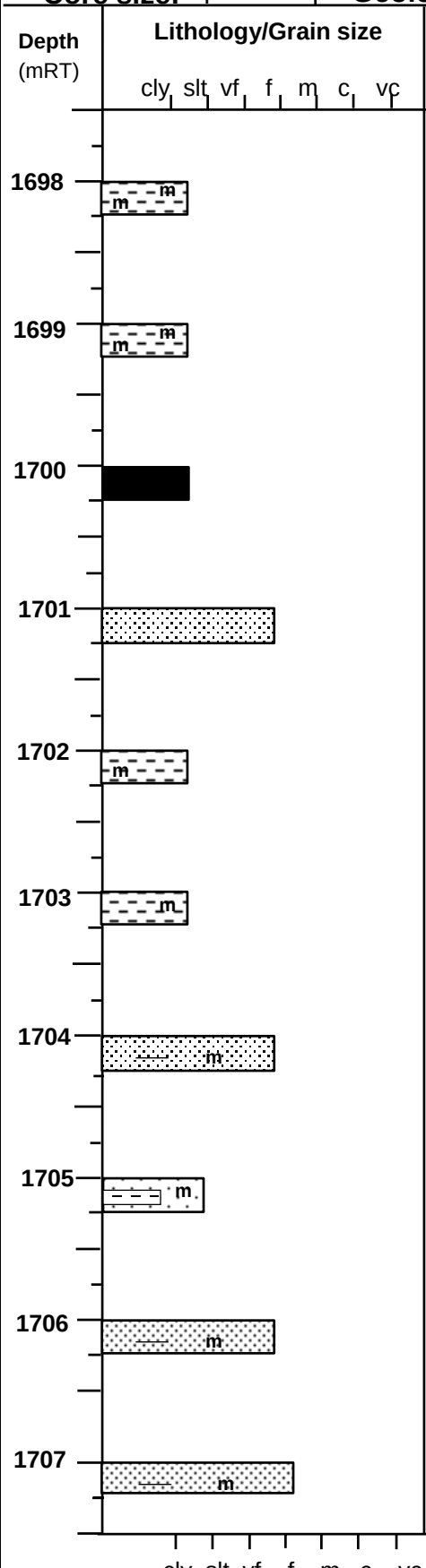
Country: Norway	**Area:** Norwegian Sea	**Field:** Linerle Prospect
Well no: 6608/11-4	**Formation:** Åre Fm.	
Core no: 2	**Interval:** 1688 – 1714m MD	**Cored:** 26 m **Rec:** 25.28 m 97.2 %
Core size: 4"	**Geologists:** Ø. Hovden	**Date:** 11.05.04



Shows						Lithological Description	Remarks
STAIN	FLUOR	CUT	POOR	FAIR	GOOD	Rock name, mod. lith., colour, grain size, sorting, roundness, matrix, cementation, hardness, sed. struct., accessories, fossils, porosity, contamination	Shows, etc.
						SST: Lt gry, sft-lse, vfn occ fn qtz grns, sbang-sbrnd, mod-vl srtd, sl arg, mica, no cmnt,sl calc mtrx, gd vis por	No shows
						CLST: Dk gry, frm-sft, non calc, v micromic, slty, grdg slts	
						CLST : a.a	
						CLST : a.a	
						CLST : med gry, minor micromic, occ lam, else a.a.	
						CLST : a.a	
						CLST : a.a, but v micromic	
						CLST : Lam dkgry/med gry, less micromic, eles a.a	
						CLST: a.a	
						CLST : med gry – med lt gry, else a.a	

CONVENTIONAL CORE DESCRIPTION

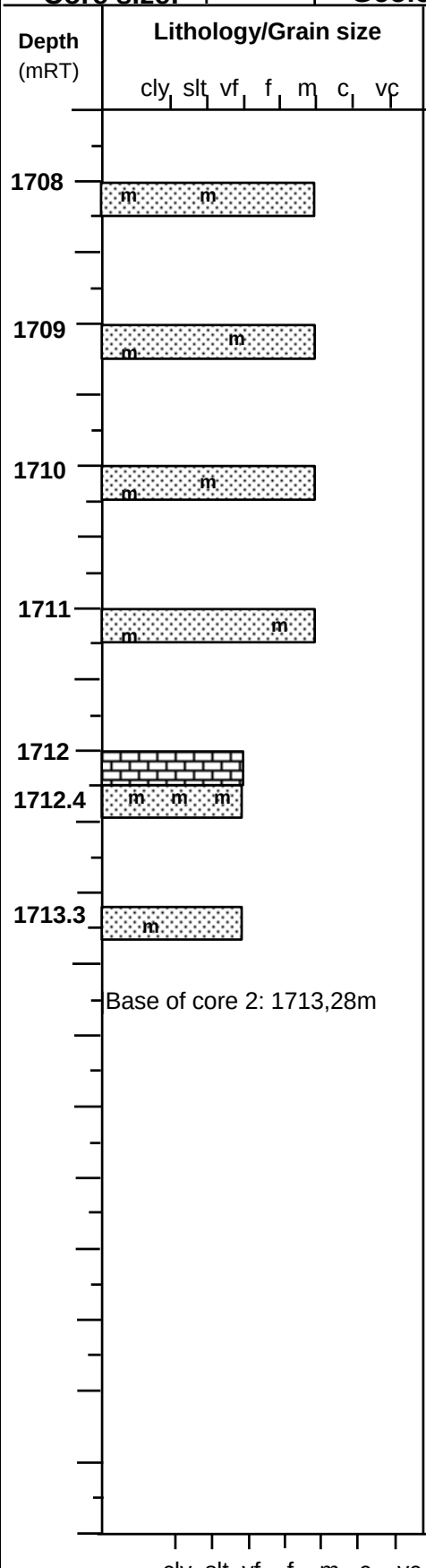
Country: Norway	**Area:** Norwegian Sea	**Field:** Linerle Prospect
Well no: 6608/11-4	**Formation:** Åre Fm.	
Core no: 2	**Interval:** 1688 - 1714 m MD	**Cored:** 26 m **Rec:** 25.28 m 97.2 %
Core size: 4"	**Geologists:** Ø. Hovden	**Date:** 11.05.04



Shows						Lithological Description	Remarks
STAIN	FLUOR	CUT	POOR	FAIR	GOOD	Rock name, mod. lith., colour, grain size, sorting, roundness, matrix, cementation, hardness, sed. struct., accessories, fossils, porosity, contamination	Shows, etc.
						CLST: med lt gry-md gry, frm-sft, non calc, v micromic, slty, grdg slts	
						CLST: a.a	
						COAL : Blk, hd, brtl, shny	
					■	**SST :** Lt gry, vf, grg Lt gry, sft-lse, vfn occ fn qtz grns, sbang-sbrnd, mod-vl srtd, sl arg, mica, no cmnt,sl calc mtrx,slit, occ grdg sltst, gd vis por	No Shows
						CLST: a.a	
						CLST: a.a	
					■	**SST :** a.a and non calc	No shows
			■			**SLTS :** Med lt gry, sft, lse, sndy, grdg vf sst, v mica, lam w/dk gry clst	
					■	**SST :** pl yelish brn, pl olv, fn, occ vfn qtz, sb rnd, wl srtd, sl mica, occ blk spks, non cemntd, gd vis por	No Shows
					■	**SST:** a.a, but alst occ med	No Shows

CONVENTIONAL CORE DESCRIPTION

Country: Norway	**Area:** Norwegian Sea	**Field:** Linerle Prospect
Well no: 6608/11-4	**Formation:** Åre Fm.	
Core no: 2	**Interval:** 1688 - 1714 m MD	**Cored:** 26 m **Rec:** 25.28 m 97.2 %
Core size: 4"	**Geologists:** Ø. Hovden	**Date:** 11.05.04



Depth (mRT)	Shows: STAIN	Shows: FLUOR	Shows: CUT	Shows: POOR	Shows: FAIR	Shows: GOOD	Lithological Description (Rock name, mod. lith., colour, grain size, sorting, roundness, matrix, cementation, hardness, sed. struct., accessories, fossils, porosity, contamination)	Remarks (Shows, etc.)
1708						■	**SST:** pl yelish brn, pl olv, gen med, but also vf-f, qtz, sbrnd, wl srtd, mica, occ blk spks, non cemntd, gd vis por	No shows
1709						■	**SST:** a.a	No shows
1710						■	**SST :** a.a	No shows
1711						■	**SST :** a.a	No Shows
1712							**LS :** Med gry, v hd, tr blk spks, tr mica, sl tr sd, f – med xln, sl arg, no vis por	
1712.4				■			**SST :** Lam, fn, spkld w/ org mat (koal?), v mica, Frm, non calc, non cmtd, mod vis por in cln sd, pr vis por in carb lam	No Shows
1713.3						■	**SST :** pl yelish brn, pl olv, gen med, but also vf-f, qtz, sbrnd, wl srtd, sl mica, occ blk spks, non cemntd, gd vis por	No Shows