Final Well Report

Well: 30/9-19 A

PL079

HYDRO

STATOIL

saga

E&P Division

Access	
Confidential E&P	
Downgrading	
Retention	
5 years	

Title			
Final Well Report Well 30/9-19A, PL079			
Keywords			
Geology, Geophysics, Petrophysics, Drilling			
Document category		Document ID	Amendment no.
Report		R088368	
Area code	System code	Procurement ref./Package no.	
SCM reference		Tag no.	
Quadrant/Block/Well		Licence no.	Project
30 / 30/9 30/9-19A		PL079	
Pages/appendices/volume(s)		Replaces	

	Name(s)	Org. unit	Date	Signed
Author(s)	Bjørn Kjellin	Operationsgeology	11/6-99	BK
Controlled	Tor Martin Rønningsland	E&P	15/6-99	TMR
Verified	Olav Rong	E&P	17/6-99	O.R.
Approved	Bård Krokan	E&P	16/6-99	BKr

Rev./ status	Date	Reason for issue	Author	Contr.	Disc. appr.	Proj. appr.	Hydro appr.

F.nr.

Postal address: Office address: Phone: National: Internat.: Telefax: National: Internat.: Telex:

NORSK HYDRO

FINAL WELL REPORT

WELL 30/9-19A

JUNE 1999

LIST OF CONTENTS, WELL 30/9-19

INTRODUCTION:

Preface page I

Location map page II

Summary of well data page III

SECTION A: GEOLOGY

SECTION B: OPERATIONS

SECTION C: COMPLETION LOG

POST SITE SURVEY PANEL

PREFACE

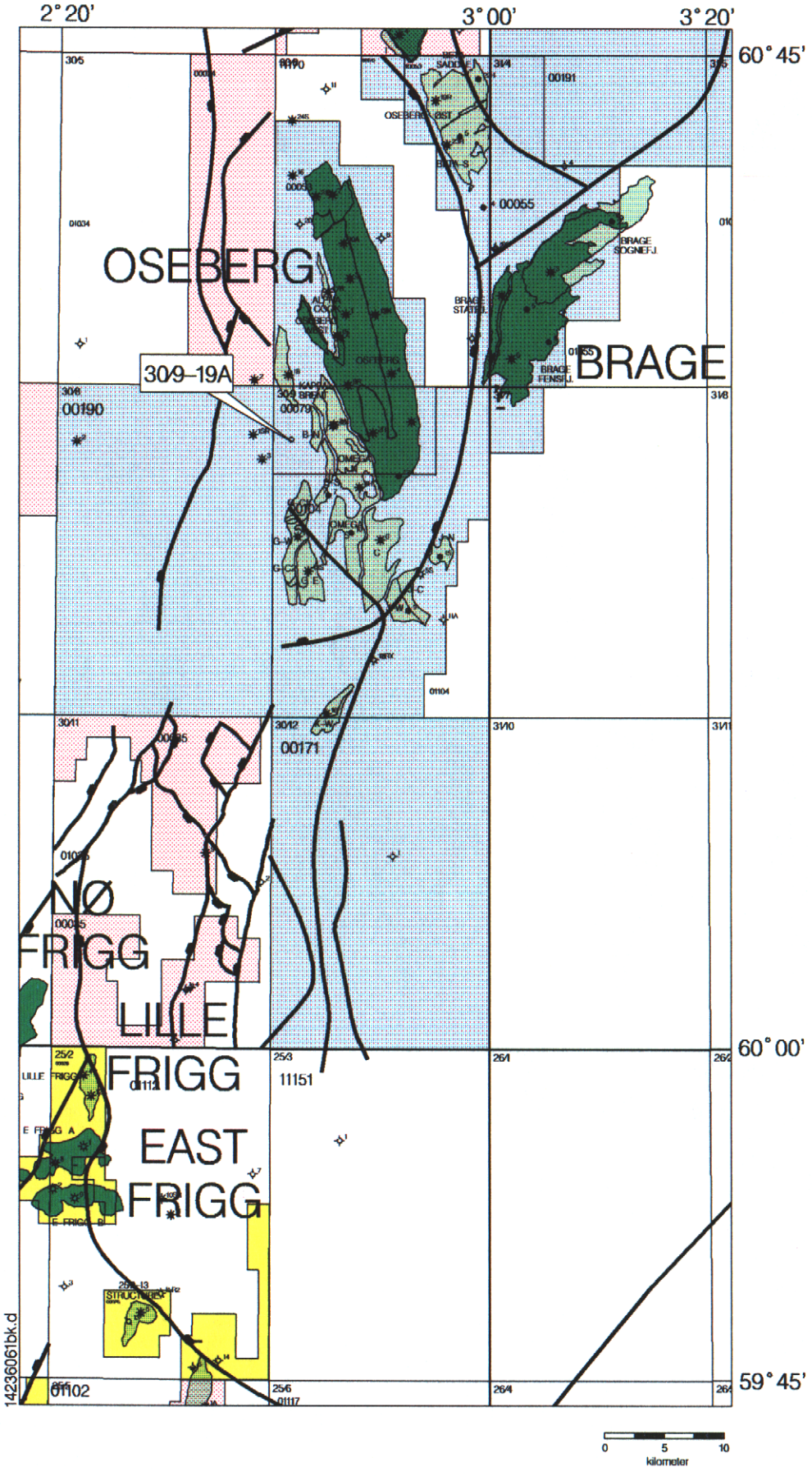
License PL 079 was awarded to the Norsk Hydro PL 079 license group in 1982 with Norsk Hydro as the operator.

The licensees' percentage share of the block is as follows:

Den Norske Stats Oljeselskap a.s. (Statoil)	73.5%
Norsk Hydro ASA (operator)	16%
Saga Petroleum ASA	10.5%

The well was drilled by Norsk Hydro ASA., on behalf of the group, during October - November 1998 (see Location Map, page II).

All depths in this report are mMD RKB unless otherwise stated


2° 20'
3° 00'
3° 20'
60° 45'
60° 00'
59° 45'
OSEBERG
309–19A
BRAGE
NØ FRIGG
LILLE FRIGG
EAST FRIGG
00190
00171
11151
01102
00055
00191
0 5 10
kilometer
14236061bk.d

SUMMARY OF WELL DATA	
LOCATION:	60° 27' 35.38"N 02° 41' 38.94" E UTM 6702 819.9mN 483 176.9mE ED 50, UTM Zone 31, CM 03°E
OPERATOR: RIG: CONTRACTOR:	Norsk Hydro a.s West Delta Smedvig
KB ELEVATION (to MSL): WATER DEPTH (MSL):	29m 105m
START OF OPERATIONS: WELL KICKED OFF: REACHED TD ON: COMPLETED: STATUS: FORMATION AT TD:	24.10.1998 28.10.1998 18.11.98 06.12.98 Gas/oil discovery in Tarbert 2 Fm. Permanently plugged and abandoned Dunlin Gp.
TD DRILLER (mRKB): TD LOGGER (mRKB):	3775 3778
DRILLING DEPTHS:	36" to 231m 9 7/8" to 1202m (pilot hole) 26" to 1205m (hole opening) 17 1/2" to 2329m 12 1/4" to 3197m 8 1/2" to 3775m
CASING DEPTHS:	30" to 231m 20" to 1198m 13 3/8" to 2318.5m 9 5/8" to 3187m

SECTION A

GEOLOGY

LIST OF CONTENTS SECTION A

1 OBJECTIVES 1
2 RESULTS 2
3 BIOSTRATIGRAPHY 3
4 LITHOSTRATIGRAPHY 5
4.1 Rogaland Group (2323 - 2410m) 5
4.2 Shetland Group (2410 - 3140 m MD) 6
4.3 Cromer Knoll Group (3140 - 3179.5 m MD, 3071 - 3103 m TVD) 7
4.4 Viking Group (3179.5 - 3210 m MD, 3101.5 - 3127 m TVD) 8
4.5 Brent Group (3210 - 3730m MD, 3127 - 3588 m TVD) 8
5 HYDROCARBON SHOWS 13
5.1 Gas Record 13
5.2 Oil stain and fluorescence 16
6 CORING 17
6.1 Conventional cores 17
6.2 Sidewall cores 17
7 LOGGING 18
7.1 Wireline logs 18
7.2 MWD logs 19
7.3 Bottom hole temperatures from wireline logs 19
8 PETROPHYSICAL RESULTS 20
8.1 Petrophysics 20
8.2 Well Testing 23
8.3 Estimated Pore Pressure, Fracture, Overburden and Temperature Gradients 25
9 Geophysical Results 28
10 POST SITE SURVEY REPORT 31
11 STANDARD AND SPECIAL STUDIES 36

LIST OF CONTENTS SECTION A

SECTION A: LIST OF FIGURES, TABLES AND APPENDICES

FIGURES		PAGE
3.1	Chrono- and lithostratigraphy	4
5.1	Gas summary	14
5.2	Gas summary	15
8.1	Petrophysical evaluation Tarbert reservoir	22
8.2	Estimated pore pressure, fracture and overburden gradient	26
8.3	Formation temperature gradient	27
9.1	Time versus depth plot	29
TABLES		
5.1	Shows summary	16
6.1	Conventional cores	17
7.1	Wireline logs	18
7.2	Bottom hole temperatures from logs	19
8.1	Petrophysical zone averages net reservoir	21
8.2	Test results	24
9.1	Geophysical summary	30

APPENDICES

I	Core descriptions
II	Well Summary
	Geological Well Summary
	MDT Results

1 OBJECTIVES

The 30/9-19A well was the seventh well in PL 079, representing a sidetrack from the first 30/9-19 vertical well on the Delta structure. The well tested the DeltaS1 compartment of the Delta structure, which is located to the west of DeltaN1/30/9-19. The main target of the well was the Brent deltaic sands of the Tarbert Fm.

The primary objectives were as to:

Identify fluid types and distribution in hangingwall block to the southwest of 30/9-19 on the upthrown side in order to confirm HC water contact(s) and prospect models III or IV (Delta Max, ref. 30/9-19 Well Programme).

Drill through the ORE formation in order to confirm the presence of oil as observed in the main track of well 30/9-19.

Secondary, evaluate the exploration potential within the Lower Cretaceous sandstone encountered in the main track of well 30/9-19.

Optional; Perform Drill Stem Testing in order to

Investigate and confirm the dynamic reservoir properties i.e. productivity and effect of faulting in the area.

Aquire sufficient fluid samples for analysis.

2 RESULTS

The well was spudded 24.Oct 1998 and reached a total depth of 3775 m RKB (3632 mTVDRKB) in Dunlin Gp. on 18.Nov. 1998. The well was permanently plugged and abandoned as a gas/oil discovery 22.Dec. 1998.

The main results were as follows:

- The Tarbert 2 main reservoir was penetrated at 3208.5 mTVDRKB (3310.5 mMD), 5.5 m shallower than prognosed, and extends down to 3290.5 mTVDRKB (3410.5 mMD). The well confirmed the geological reservoir model. The reservoir properties are fairly good with average net/gross and porosity of about 0.83 and 17%, respectively, and permeability measurements generally ranging between 10 mD and 1000 mD.

-The Tarbert 2 main reservoir is filled by gas down to 3236 mTVDRKB (3344 mMD), and oil between 3238.7 mTVDRKB (3347.5 mMD) (oil-up-to) and 3255.5 mTVDRKB (3368 mMD), separated by a tight carbonate cemented layer (Tarb2em). Hydrocarbons are found only within the upper part of the reservoir, i.e. above the tight "lagoonal event" or Tarb2d. A thin water zone is defined between the oil column and the "lagoonal event".

The oil column is not in direct pressure communication with the gas above the carbonate cemented layer (Tarb2em) based on pressure data and CPI. This layer may thus represent an important pressure barrier both with respect to differences in fluid contacts above and below as well as production behavior.

The lower part of the Tarbert 2 reservoir (Tarb2b-c) is water filled, showing a higher aquifer overpressure (0.5-1 bar) than within the upper Tarbert 2 reservoir. The zone is probably containing hydrocarbons upflanks of the well, with a HCWC shallower than above the lagoonal event.

Tarbert 1 is water bearing with a 1-2 bar lower overpressure than the lower part of the Tarbert 2 reservoir.

The ORE unit were found to be water bearing in this well.

One core were cut in the well covering the lowermost part of Tarbert 3 and the upper part of Tarbert 2, i.e. 3200.5-3234 mTVDRKB (3300-3342 mMD)

An oil test of the interval 3209.5-3222.5 mTVDRKB (3347.4-3363.4 mMD) was performed showing fairly good production performance, i.e. a maximum flow of 895 Sm3 oil/per day with a GOR of 415 Sm3/Sm3 (solution GOR approximately 210 Sm3/Sm3). Free gas from the gas zone above the test interval is thought to enter the wellbore area through fractures in the carbonate cemented layer (Tarb2em). Productivity of the formation is calculated to 10.7 Sm3/d/bar, and permeability thickness is 1030 mDm. There are no indications of faults influencing the test.

3 BIOSTRATIGRAPHY

The biostratigraphical analysis of well 30/9-19A was carried out by Stratlab AS. The analysed interval was 3050m - 3775mRKB (TD) (measured depth). The results are documented in the 30/9-19A Routine Biostratigraphical Report (REF ZZZ). The results have further been evaluated and interpreted according to Norsk Hydro internal biozonation system and are presented in Fig. 3.1.

The main results of the analysis can be summarized as follows:

- The youngest sediments analysed (at 3050m) are claystones from the Shetland Gp / Kyrre Fm of Late Cretaceous / Coniacian age.

- The oldest sediments of the Late Cretaceous are of Turonian age.

- Sediments of Cenomanian age are not identified in this well.

- The Early Cretaceous Cromer Knoll Gp consists of sediments of Late Albian and Early Aptian ages, separated by an unconformity. The Early Aptian is also unconformably overlying the Ryazanian sediments of the Draupne Fm.

- The Viking Gp / Draupne Fm consists of sediments of Ryazanian and Kimmeridgian ages, separated by an unconformity, covering the Volgian and probably parts of Kimmeridgian and Ryazanian.

- There is an unconformity between the Kimmeridgian (Draupne Fm) and the underlying Early Oxfordian Heather Fm sediments.

- There is also a major unconformity between the Late Callovian Heather Fm and the Early Bathonian Brent Gp / Tarbert Fm.

- The main reservoir interval in this well is of Bajocian age.

- At 3730m sediments of Late Toarcian age was reached.

REF/ZZZ/: Well 30/9-19A, Biostratigraphy, Interval 3050m - 3775m, April 1999, Stratlab AS.

HYDRO

WELL: 30/9-19 A

NB! NOT TO SCALE

DEPTH RKB 134 m | ELEVATION KB: 29m | ALL DEPTHS IN METERS (mRKB)

CHRONOSTRATIGRAPHY				LITHOSTRATIGRAPHY	
SYSTEM	SERIES/ STAGE	DEPTH m	THICKNESS m	GROUP	FORMATION/ MEMBER
TERT.	LOWER TERTIARY/ PALEOCENE			ROGALAND	LISTA/VÅLE FM.
CRETACEOUS				SHETLAND	2410 m (2409.5 m TVD) HARDRÅDE/TOR FM.
					2440.5 m (2438 m TVD) JORSALFARE FM.
					2659 m (2654.5 m TVD) KYRRE FM.
		3050			
	CONIACIAN (top not seen)		20		3062 m (3006.5 m TVD) TRYGVASSON FM.
		3070			
	TURONIAN				
JURASSIC		3150	10	CROMER KNOLL	3140 m (3071 m TVD) RØDBY FM.
	LATE ALBIAN	3160	10		
	LATE APTIAN	3170	10		
	EARLY APTIAN	3180	5		
	RYAZANIAN	3185	5		
	KIMMERIDGIAN	3190	15	VIKING	3179.5 m (3103 m TVD) DRAUPNE FM.
	MIDDLE OXFORDIAN	3205			3187.5 m (3110 m TVD) HEATHER
	LATE CALLOVIAN	3215	10	BRENT	3210 m (3127 m TVD) TARBERT 4
	EARLY BATHONIAN		85		3277 m (3182 m TVD) TARBERT 3
		3270			
	BAJOCIAN		160		3310.5 m (3209.5 m TVD) TARBERT 2
					3440.5 m (3316 m TVD) TARBERT 1
					3472.5 m (3344.5 m TVD) NESS
	EARLY BAJOCIAN	3530	370		3711.5 m (3570 m TVD) ETIVE
					3714.5 m (3573 m TVD) OR
		3730			
	LATE TOARCIAN		45	DUNLIN	3730 m (3588 m TVD) DRAKE
		TD			3775 m (3631.7 m TVD)

4 LITHOSTRATIGRAPHY

All depths are in mMD RKB (RKB elevation is 29m). At levels where the well is deviated the depths are also given in mTVD RKB.

This summary is compiled predominantly from ditch cuttings descriptions. Only one conventional core was cut in the interval from 3300m to 3342 m in the well, see Table 6.1.

Wireline and MWD logs were used to aid lithological interpretation and the placement of formation boundaries.

Well 30/9-19 A was kicked off from well 30/9-19 at 2323m MD.

4.1 Rogaland Group (2323 - 2410m)

Lista Formation (2323 - 2395 m MD, 2322.5 - 2394.5 m TVD)

This interval comprises Claystone with stringers of Limestone and Dolomite

CLAYSTONE:	dark grey to olive black, soft to moderately hard, predominantly firm, sub blocky to amorphous, non calcareous, silty, trace carbonaceous/glauconitic, rare micromica, locally very fine sandy lenticules.
LIMESTONE:	light olive grey, soft to firm, sub blocky to blocky, microcrystalline, slightly silty.
DOLOMITE:	dusky yellowish brown, hard, brittle, platy, argillaceous, micro to cryptocrystalline, calcareous
Age:	Late Paleocene

Våle Formation (2395 - 2410 m MD, 2394.5 - 2409,5 m TVD):

This interval comprises Claystone with stringers of Limestone.

CLAYSTONE:	dark grey to olive black, soft to moderately hard, predominantly firm, sub blocky to amorphous, non calcareous, silty, trace carbonaceous/glauconitic, rare micromica, locally very fine sandy lenticules.
LIMESTONE:	light olive grey, soft to firm, sub blocky to blocky, microcrystalline, slightly silty.
Age:	Late - Early Paleocene

4.2 Shetland Group (2410 - 3140 m MD)

The Shetland Group consists of Hardråde, Jorsalfare, Kyrre and Tryggvason Formations.

Hardråde Formation (2410 - 2440,5 m MD, 2409.5 - 2438.0m TVD)

This interval comprises Limestone with minor Claystone.

LIMESTONE:	white to very light grey, local Trace greenish grey and light brownish grey, moderately hard to friable, blocky, micro to predominantly cryptocrystalline, clean, part trace to common glauconitic, rarely very argillaceous. locally rare chert.
CLAYSTONE:	olive black, dark greenish grey, soft to firm, rare moderately hard, sub blocky to amorphous, moderately to very calcareous, silty, trace to common glauconitic.
Age:	Late Maastrichtian

Jorsalfare Formation (2440,5 - 2659 m MD, 2438.0 m - 2654.5 m TVD)

This interval comprises Claystone with minor Limestones and locally Sandstone.

CLAYSTONE:	olive black, dark green grey, soft-firm, soluble, sub blocky-amorphous, moderately to very calcareous, silty, trace to common glauconite, local trace euhedral microcrystalline pyrite.
LIMESTONE:	white to very light grey, light brown grey, moderately hard to friable, blocky, crypto to microcrystalline, clean, partly trace to common glauconitic, rarely very argillaceous.
SANDSTONE:	clear to translucent quartz, very fine to fine, very well sorted, sub rounded to rounded, loose grains, trace glauconite.
Age:	Early - Late Maastrichtian

Kyrre Formation (2659 - 3062 m MD, 2654.5 - 3006.5m TVD)

This interval comprises Claystone with locally stringers of Limestones and occasionally Dolomite.

(2659.0 - 2677,5 m MD)

CLAYSTONE:	medium light to light grey, minor greenish grey, very to moderately calcareous, soft to firm, amorphous to sub blocky, slightly silty, partly glauconitic, rare micromicaceous, locally pyritic.
LIMESTONE:	white to very light grey, light brownish grey, moderately hard to friable, blocky, crypto to microcrystalline, clean, occasionally glauconitic.

2677.5 - 3062m

CLAYSTONE:	olive grey to olive black, rare dark green grey, soft to firm, friable, partly soluble, subblocky to amorphous, slightly to very calcareous, predominantly moderately calcareous, slightly silty, partly glauconitic/carbonaceous, rarely micromicaceous, local pyrite.
LIMESTONE:	very light grey, pale to dark yellowish brown, moderately hard, brittle to friable, blocky to platy, locally crypto to microcrystalline, partly dolomitic.
DOLOMITE:	dusky yellowish brown, hard, brittle, blocky, microcrystalline.
Age:	Late Maastrichtian - Coniacian

Tryggvason Formation (3062 - 3140 m MD, 3006.5 - 3071.0m TVD)

This interval comprises Claystone with minor Limestone stringers:

CLAYSTONE:	olive grey to olive black, soft to firm, soluble, amorphous to subblocky, moderately to very calcareous, slightly silty, trace carbonaceous material, trace glauconite, rare micromicaceous, very rare Pyrite.
CLAYSTONE:	olive grey to olive black, soft to firm, friable, subblocky, slightly to very calcareous, predominantly moderately calcareous, slightly silty, trace carbonaceous material, trace glauconitic, rare micromicaceous, local trace Pyrite.
LIMESTONE:	greenish grey to white, firm to moderately hard, blocky, part dolomitic, micro to cryptocrystalline.
Age:	Coniacian - Turonian

4.3 Cromer Knoll Group (3140 - 3179.5 m MD, 3071 - 3103 m TVD)

The Cromer Knoll Group consists of the Rødby Formation.

Rødby Formation (3140 - 3179.5 m MD, 3076 - 3100 m TVD)

This interval consists of interbedded claystones with limestone stringers.

CLAYSTONE:	moderate brown, soft to firm, amorphous to subblocky, soluble, non calcareous, slightly silty, rare micropyritic.
CLAYSTONE:	olive grey , soft to firm, soluble, amorphous to subblocky, moderately to very calcareous, slightly silty, trace carbonaceous material, trace glauconite, rare micromicaceous, very rare Pyrite.
CLAYSTONE:	olive black, firm to moderately hard, blocky to subblocky, non to slightly calcareous, slightly silty, rare glauconitic, rare micromicaceous, very rare Pyrite.
LIMESTONE:	greenish grey to white, firm to moderately hard, blocky, part dolomitic, micro to cryptocrystalline.
Age:	Late Albian - Early Aptian

4.4 Viking Group (3179.5 - 3210 m MD, 3101.5 - 3127 m TVD)

The Viking Group consists of the Draupne and Heather Formations.

Draupne Formation (3179.5- 3187.5 m, 3101.5 - 3110 m TVD)

This interval consists of Claystone.

CLAYSTONE:	grey black to olive black, brown black, firm to moderate hard, blocky, slightly silty, brittle to fissile, slight to moderate calcareous, micromicaceous, pyritic nodules, micropyrite, trace carbonaceous material.
Age:	Ryazanian - Kimmeridgian

Heather Formation (3187.5 - 3210 m, 3110 - 3127m TVD)

This interval consists of Claystone.

CLAYSTONE:	as above but becoming more silty at bottom.
Age:	Kimmeridgian - Late Callovian

4.5 Brent Group (3210 - 3730m MD, 3127 - 3588 m TVD)

Tarbert 4 Formation (3210- 3277 m MD, 3127 - 3182 m TVD)

This interval consists of Sandstone and Siltstone.

SANDSTONE: olive grey to medium dark grey, clear to translucent quarts, very fine to fine, occasionally medium, subangular to subrounded, moderate to well sorted, predominately as loose grains, micaceous, pyritic, rare glauconite, slight silty, slight to very calcareous, rare argillaceous material.

SILTSTONE: olive black to brown black, olive black, moderate hard to friable, brittle, blocky, argillaceous, trace carbonaceous material, rare micropyrite, slight to non calcareous, micromicaceous, pyrite nodules.

Age: Late Callovian - Early Bathonian

Tarbert 3 Formation (3277 - 3310,5 m MD, 3182 - 3209,5 m TVD)

This interval consists of Siltstone Sandstone.

SANDSTONE: light grey to dusky yellowish brown, clear to milky white quartz, very fine to fine, rare medium, well sorted, subangular to subrounded, firm to friable, predominantly as lose grains, trace to good trace mica, trace pyrite, rare carbonaceous, no visible porosity

Age: Early Bathonian - Bajocian

Tarbert 2 Formation (3310,5 - 3440.5 m MD, 3209,5 - 3316 m TVD)

(3310.5-3372.5m)
This interval consists of sandstone.

SANDSTONE: olive grey to dusky yellowish brown, clear translucent quartz, fine to very coarse, predominantly medium to coarse, subangular to subrounded, moderately to well sorted, moderate hard, silica cemented, rare calcitic cemented, rare pyrite, rare carbonaceous material, moderate visible porosity

SANDSTONE: light grey to light brownish grey, predominantly clear to milky white quartz, fine, tr very fine to medium, locally medium to very coarse, moderate to well sorted, locally poor sorted, predominantly as lose grains, occasionally friable to hard aggregates, subangular to subrounded, locally calcitic cemented, locally silica cemented, trace mica, trace pyrite, trace carbonaceous, trace shale/claystone, trace siltstone, no to poor visible porosity.

(3372.5 - 3410m)
This interval consists of sandstones, claystones and coal/coaly shale.

SANDSTONE: light grey to light brownish grey, predominantly clear to milky white quartz, fine, tr very fine to medium, locally medium to very coarse, moderate to well sorted, locally poor sorted, predominantly as lose grains, occasionally friable to hard aggregates, subangular to subrounded, locally calcitic cemented, locally silica cemented, trace mica, trace pyrite, trace carbonaceous, trace shale/claystone, trace siltstone, no to poor visible porosity.

SANDSTONE: light grey to light brownish grey, predominantly clear to milky white quartz, fine, occasionally medium to coarse, in part very coarse, subangular to subrounded, moderate to well sorted, locally calcitic cemented, locally silica cemented, trace mica, trace pyrite, trace to abundant coal, slightly silty, no to fair visible porosity.

CLAYSTONE: brown to brownish black, firm to moderate hard, blocky carbonaceous to very carbonaceous grading coaly shale, in part silty grading siltstone, non calcareous, micromicaceous to micaceous, in part micropyritic.

COAL/COALY SHALE: brown black to black, moderate hard to hard.

(3410-3440.5m)
This interval consists of sandstone and claystone.

SANDSTONE: light grey to light brownish grey, predominantly clear to milky white quartz, fine to medium, trace coarse, subangular to subrounded, moderate to poor sorted, trace mica, trace pyrite, slightly calcareous, trace carbonaceous material. no to fair visible porosity.

CLAYSTONE: light grey to grey,brown to brown black, soft to hard, blocky, carbonaceous to very carbonaceous grading coal, non calcareous, micromicaceous, silty.

Age: Bajocian - Early Bajocian

Tarbert 1 Formation (3440.5 - 3472,5 m MD, 3316 - 3344,5 m TVD)

This interval consists of sandstone and claystone.

SANDSTONE: light grey to light brown grey, clear, translucent to milky white quarts, fine to medium, trace coarse, predominately loose, subangular to subrounded, moderate to poor sorted, trace micaceous, trace pyrite, slight calcareous, trace carbonaceous material.

CLAYSTONE: olive black, brown to brown black, firm to moderate hard, blocky, micromicaceous to micaceous, micropyritic, non calcareous, carbonaceous material, partly silty grading micaceous siltstone.

Age: Bajocian

Ness Formation (3472,5 - 3711,5 m MD, 3344,5 - 3570 m TVD)

This interval consists of claystone and sandstone with siltstone, occasional coal interbeds.

CLAYSTONE: olive black, brown to brown black, becoming olive grey to dark grey, brown grey to brown black, firm to moderate hard, blocky, micromicaceous to micaceous, micropyrite, non calcareous, carbonaceous material, partly silty, grading siltstone, partly very coaly to grading Coal.

SANDSTONE: light grey to medium grey, light brown grey, predominately clear to milky white quarts, very fine to medium, locally trace coarse, predominately loose grains, subangular to subrounded, poor to well sorted, occasionally aggregates, partly silica cemented, trace kaolinite cement, trace micaceous, trace pyrite, trace carbonaceous material, non calcareous, no to poor visible porosity.

SILTSTONE: light grey to medium dark grey, off white to light brown, olive grey, soft to firm, blocky, parallel laminated, trace mica, trace coal fragments, locally very fine sandy to grading to very fine sandstone.

COAL: black to brown black, hard, blocky to conchoidal, brittle

Age: Bajocian

Etive Formation (3711,5 - 3714,5 m MD, 3570 - 3573 m TVD)
This interval consists of sandstone.

SANDSTONE: light grey, predominately clear to milky white quartz, fine to coarse, trace very coarse, predominately loose, subangular to subrounded, poor sorted, trace micaceous.

OR Formation (3714,5 - 3730 m MD, 3573 - 3588 m TVD)

The interval consisted of sandstones, grading into siltstone and claystone w/depth.

SANDSTONE:	light grey, predominately clear to milky quartz, fine to coarse, trace very coarse, predominately loose, subangular to subrounded, poor sorted, trace micaceous, firm to hard, becoming silty grading siltstone
SILTSTONE:	brownish grey to brown black, firm to hard, non calcareous, carbonaceous, very argillaceous grading claystone in parts
CLAYSTONE:	olive black to brownish black, brownish grey, olive grey, firm to blocky, silty, grad very silty claystone, rare micaceous, trace micropyrite, slight carbonaceous debris
Age:	Bajocian

Dunlin Group (3730 - 3775 m MD, 3588 - 3631,7 m TVD; TD)

Drake Formation (3730 - 3775 m MD, 3588 - 3631,7 m TVD)

This interval consists of claystone and siltstone, with minor sandstone.

CLAYSTONE:	olive black to brownish black, brownish grey, olive grey, firm to blocky, silty, grad very silty claystone, rare micaceous, trace micropyrite, slight carbonaceous debris
SILTSTONE:	brownish grey to brown black, firm to hard, non calcareous, carbonaceous, very argillaceous grading claystone in parts
SANDSTONE:	light grey, predominately milky to clear to translucent quartz, fine to very fine, firm to hard, calcite cemented, common loose, becoming silty grading siltstone
Age:	Late Toarcian

5 HYDROCARBON SHOWS

The evaluation of hydrocarbon shows at the wellsite was carried out in a conventional manner. A standard (Geoservices) hydrocarbon total gas detector system together with a gas chromatograph for automatic and continuous gas analysis, recorded as ppm by volume of C1 through nC4, were operational below 1205 m down to the TD of the well.

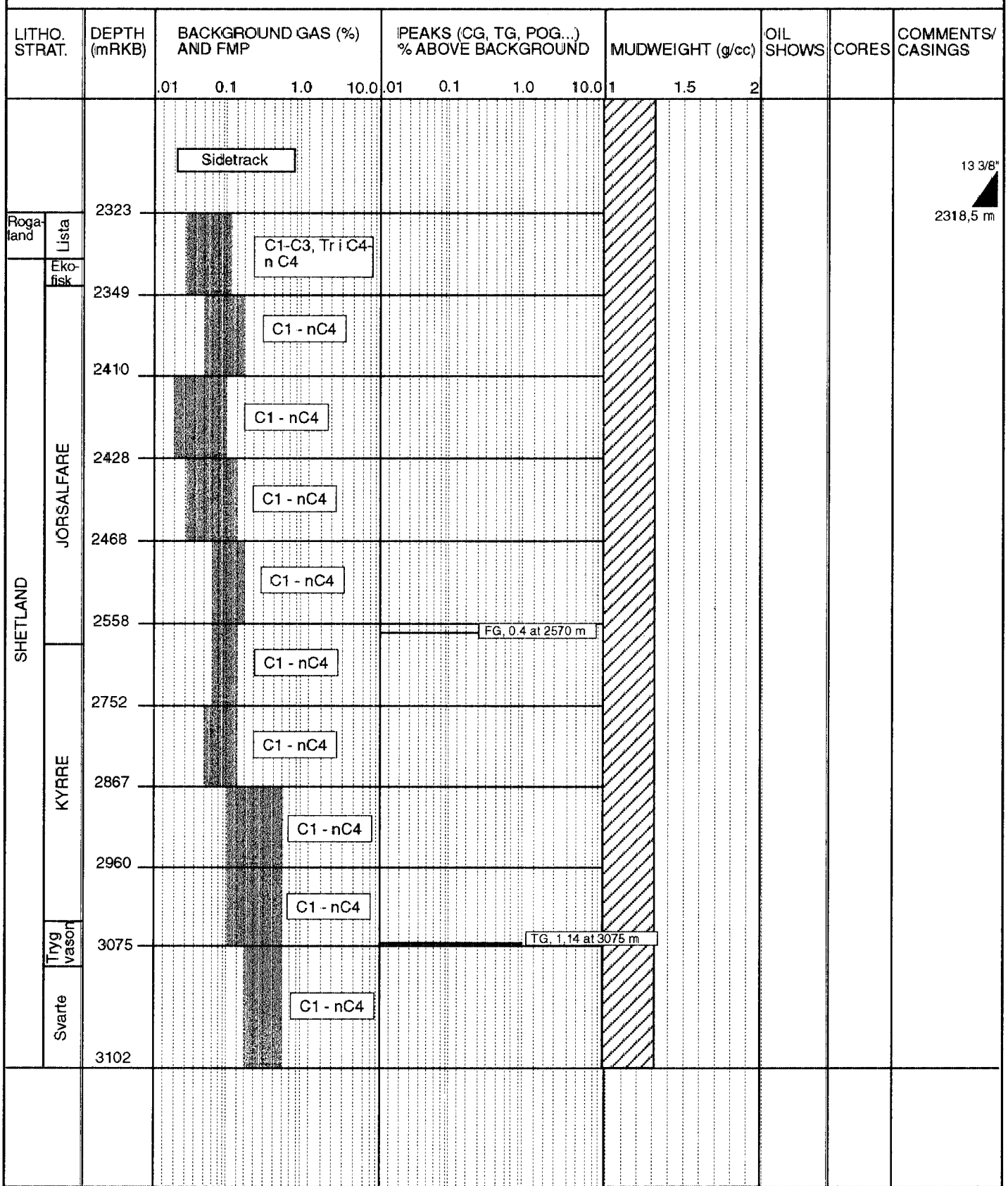
Hydrocarbon shows on ditch cuttings, cores and sidewall cores were evaluated according to procedures described in Norsk Hydro's "Wellsite Geologist's Manual".

5.1 Gas Record

134 - 1205m: This interval was drilled with returns to sea bed.

The gas summary for the well is presented in the Figures 5.1 and 5.2 on the next pages.

GAS SUMMARY WELL: 30/9-19 A

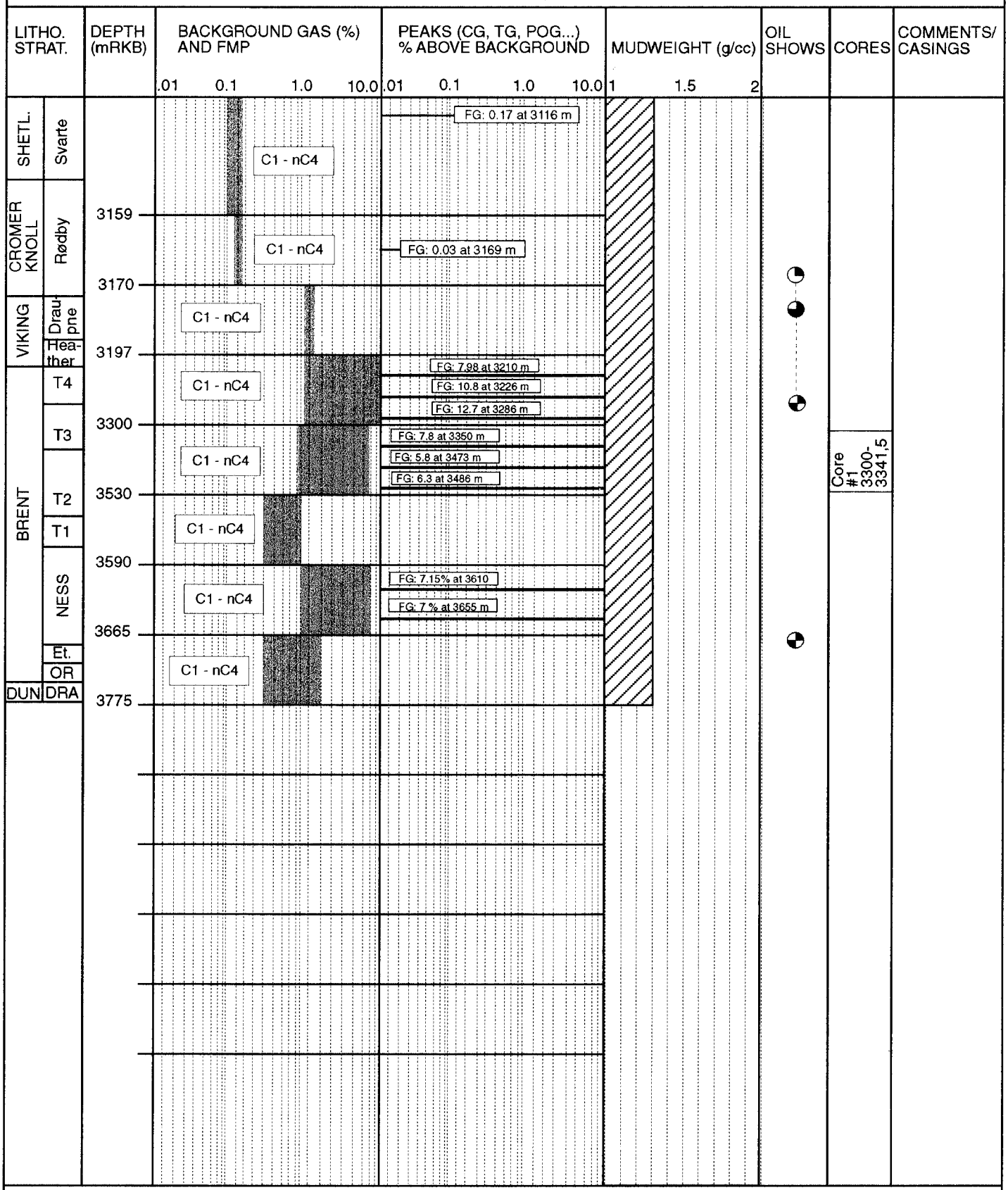


NOTE: NOT TO SCALE

CG=CONNECTION GAS, TG=TRIP GAS, WTG=WIPER TRIP GAS,
POG=PUMP OFF GAS, SWG=SWABBED GAS, FMP=FORMATION GAS PEAK

Fig. 5.1

GAS SUMMARY WELL: 30/9-19 A



NOTE: NOT TO SCALE

CG=CONNECTION GAS, TG=TRIP GAS, WTG=WIPER TRIP GAS,
POG=PUMP OFF GAS, SWG=SWABBED GAS, FMP=FORMATION GAS PEAK

Fig. 5.2

5.2 Oil stain and fluorescence

A summary of the observed shows is given in Table 5.1 below:

INTERVAL (mRKB)	SOURCE	LITHOLOGY	SHOWS DESCRIPTION
3178 - 3197	Cuttings	Claystone	No dir fluor, slo strmg bl - wh fluor cut, no vis cut, mod spty bl wh fluor res, wk yel ring vis res.
3207 - 3300	Cuttings	Sandstone	no stn, no od, no - spdt yel wh dir fluor, v wk - v slo strmg bl wh - yel wh fluor cut, no vis cut, no fluor resd, no vis resd.
3300 - 3342	Core	Sandstone	Sst: (only in porous intervals) wk pet od, no oil stn, no dir fluor, pr - slo blmg dull bl wh fluor cut, no vis cut, pr dull bl wh even fluor res, no - pr yel ring vis res.
3357 - 3365	Cuttings	Sandstone	no oil stn, spotty dull-pt bri yel dir flu (partly mineral flu) slo strmg bl wh- yel wh wk flu cut, no vis cut, wk bl wh flu resd, no vis resd.
3710	Cuttings	Sandstone	no dir flu, slo strmg wk bl wh fluor cut, no vis cut, no fluor-v wk fluor resd, no vis resd.

Table 5.1. Shows summary 30/9-19 A

6 CORING

6.1 Conventional cores

A total of 1 core was cut in the well. A summary of the cores is presented in the Tables 6.1 below and the core description can be found in Appendix I.

No	C: Cut(m) R: Recovery(m)	Rec. %	Lithology	Formations
1	C:3300 - 3342 R:3300 - 3341.5	98.8	Sandstone	Tarbert 3 - Tarbert 2

Table 6.1: Conventional cores 30/9-19 A

6.2 Sidewall cores

No sidewall cores were taken in this well.

7 LOGGING

7.1 Wireline logs

The following table is a summary of wireline logs run in the well and shows log type, date run, logged intervals and run number for each log.

Logs	Date	Logged interval (mRKB)	Run
HALS/TLD/HGNS/GPIT/AMS	18-19.11.98	3775-3150	1A
MDT/GR/	19-24.11.98	3278.5-3448	1A
CMR/GR	25.11.98	3460-3275	1A
DSI/GR	25.11.98	3760-3170	1A
USIT/CBL/VDL/GR/CCL/AMS	28.11.98	3407-3037	1A

Table 7.1: Wireline logs 30/9-19 A

7.2 MWD logs

A MWD service (Anadrill) yielding gamma ray, resistivity and survey measurements was run in the following section:

2323-3775m MD

Detailed MWD results can be found in the report "End of Well Report, MWD, for Norsk Hydro, Well 30/9-19 A."

7.3 Bottom hole temperatures from wireline logs

The table below gives a summary of the bottom hole temperatures measured from wireline logs.

Log suite	Run	Depth (mRKB)	Temp ° C	Time since circ. (hrs)	Circ. time (hrs)
CMR/GR	1A	3 460	113	20 hrs 40 min	2 hrs 30 min
DSI/GR	1A	3 760	117	16hrs 20 min	2 hrs 30 min
USIT/CBL/VDL/GR/CCL/AMS	1A	3 407	110	17 hrs 55 min	1hr 30 min

Table 7.2: Bottom hole temperatures from logs

8 PETROPHYSICAL RESULTS

Petrophysics

The petrophysical evaluation is based on wireline log data, logging while drilling data, conventional core data and formation pressure data. The details in the petrophysical interpretation are described in "Well 30/9-19 and 30/9-19 A, Formation Evaluation Report (FER) -Petrophysics".

Formation Pressure Data

One MDT (Modular formation Dynamics Tester) run covered the reservoir section of the well with an attempt of 36 pretests. Eleven were taken with possible supercharging effect, three tight, two seal failures and four with power failure due to cable damage.

The gradients from the MDT pressure points show that gas, oil and water are present in the Tarbert reservoir with densities respectively 0.25 g/cc, 0.66 g/cc and 0.99 g/cc. The gas and oil column are not in pressure communication and a gas down to is set to GDT = 3344 m MD RKB = 3206.8 m TVD MSL and an oil up to OUT = 3347.5 m MD RKB = 3209.7 m TVD MSL. The oil water contact is observed from logs at 3368 m MD RKB = 3226.5 m TVD MSL. The oil column is thus 16.8 m TVD thick.

Petrophysical Zone Averages

The petrophysical interpretation is presented in figure 8.1. This CPI utilizes high quality wireline data.

One core were cut from the Tarbert 3 into theTarbert 2 reservoir. Special core analysis on plugs from three intervals are started and the results will be finished late 1999.

The porosity from core is overbuden corrected with a factor set to 0.97. There is good agreement between calculated total porosity and overburden corrected porosity from core, and the quality of the measurements is considered good.

With cutoffs for shale volume less than of 50%, a porosity more than 11 p.u. and a water saturation less than 65% the zone averages for net sand were evaluated. The zone averages are given in table 8.1.

Zone Averages				
Zone	**Interval [m MD RKB]**	**Net Pay [m MD]**	**Porosity [%]**	**Water Saturation [%]**
Tarbert 4	3210-3277	0	-	-
Tarbert 3	3277-3310.5	2	7,9	46,7
Tarbert 2eu-g	3310.5-3344	32,3	17,7	23,6
Tarbert 2em	3344-3347	0,5	9,4	66,3
Tarbert 2el	3347-3372.5	19,2	16,9	39,8
Tarbert 2d	3372.5-3380.5	0	-	-
Tarbert 2c	3380.5-3410.5	0	16,2	88,4
Tarbert 2a	3410.5-3440.5	0	14	75,4
Tarbert 1b	3440.5-3472.5	0	17,2	85
Tarbert 1a	3449-3472.5	0	13,8	55,1
Ness	3472.5-3711.5	0	16,5	90,2
ORE	3711.5-3730	0	12,3	87,2
Dunlin	3730-3750	0	-	-

Table 8.1: Petrophysical zone averages for the 30/9-19 A net reservoir

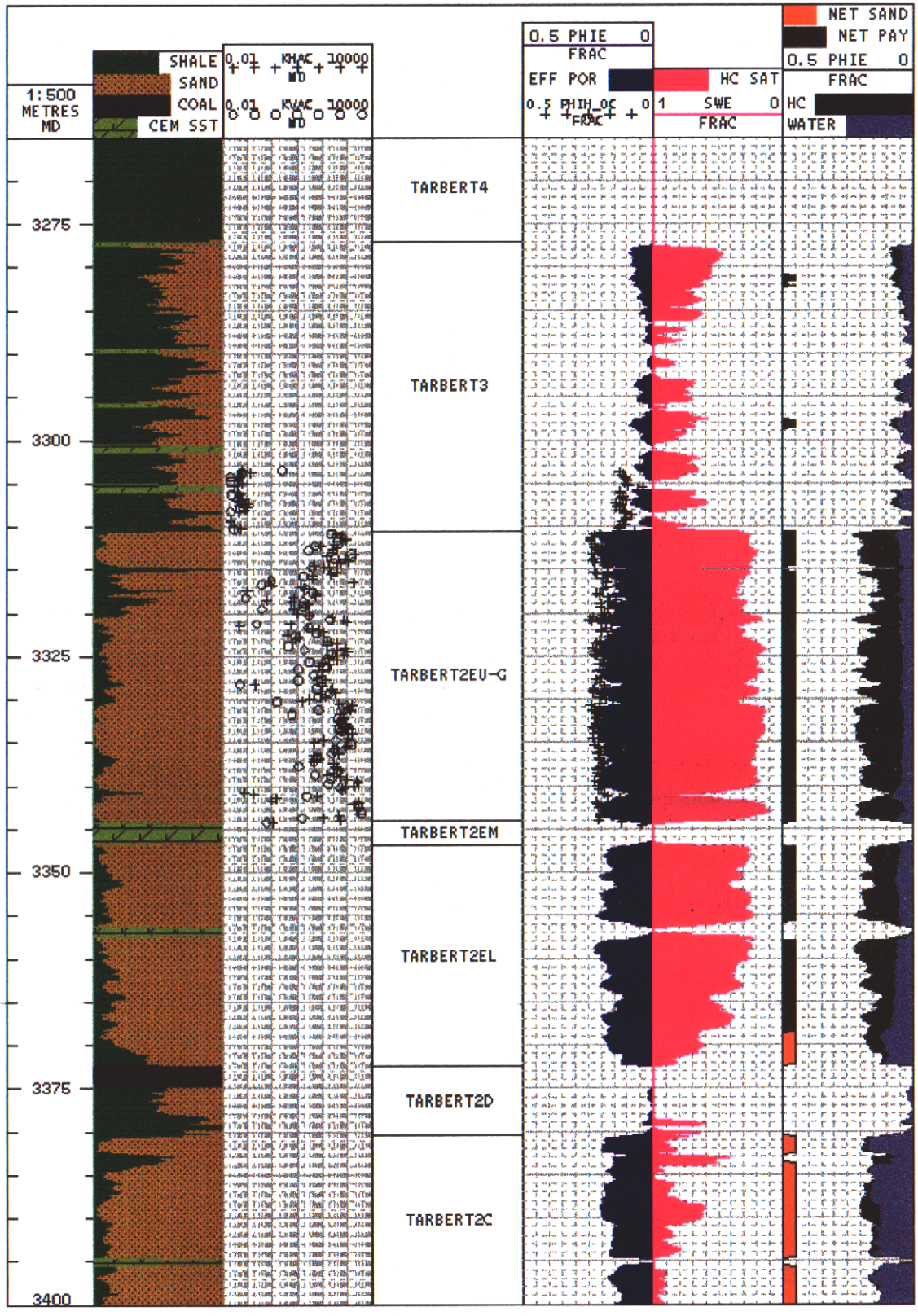


Figure 8.1: The petrophysical evaluation from the 30/9-19 A Tarbert reservoir

8.1 Well Testing

Refer to the "Well 30/9-19 and 30/9-19A Formation Evaluation Report -Testing" for a more detailed description of the well test performed.

Introduction
The exploration well 30/9-19A tested the hydrocarbon potential of the Tarbert 2 Formation in the Delta structure at Oseberg West.

The well penetrated the Tarbert 2 upper formation and was perforated over a 16 m interval. Use of MDT prior to testing proved the presence of oil in this interval. In addition it was proven from the MDT that a 33 m gas zone was present above the oil zone and these zones were separated by a thin sealing calcite barrier.

Test 1
The semi submersible drilling rig West Delta drilled the exploration well 30/9-19 and the side track 30/9-19 A from September to December 1998. Immediately after termination of drilling activities, 30/9-19A was production tested using the same rig. The well was permanently abandoned after testing the well.

The following intervals were production tested:

Test No.	Formation	Fluid	Perforation m MD RKB	Perforation m TVD MSL
1	Tarbert 2	Oil	3347.4 - 3363.4	3209.51 - 3222.51

The Tarbert 2 formation tested oil during the production test. The test objectives in prioritised sequence were:

- Determine the productivity and reservoir properties.
- Obtain representative fluid samples.
- Determine initial reservoir conditions.
- Determine minimum reservoir volumes and boundary effects.

The following table summarizes the test results:

Parameter Test 1		Main Flow (High Rate)
Flow Measurements		
Choke size	(inch)	64/64
Oil rate	(Sm^3/d)	893,5
Gas rate	(10^3 Sm^3/d)	367,4
GOR	(Sm^3/Sm^3)	414,7
Water rate	(Sm^3/d)	0
FBHP (1)	(bar)	246,5
FBHT (1)	(°C)	120,7
FWHP	(bar)	94,8
FWHT	(°C)	78,2
P_{sep}	(bar)	36,9
T_{sep}	(°C)	69,4
Maximum H_2S	(ppm)	2,5
Maximum CO_2	(%)	2
Maximum solids	(%)	Traces
Oil density at 15 °C	(g/cm^3)	0,84
Gas gravity	(air=1)	0,71
Pressure Transient Analysis Results		
Initial reservoir pressure	(bar)	340.69 at mid perf. (3355.4 m MD RKB) (3216 m TVD MSL)
Initial reservoir temperature	(°C)	121.4 (max. temperature recorded whilst flowing)
Analysis model		homogeneous
Permeability thickness	(mD m)	1 030
Permeability	(mD)	74
Skin (total)		4,7
Skin (mechanical)		-1,2
Skin (rate dependent)	($1/m^3/d$)	0,01
Distance of Investigation	(m)	427
Productivity Index	($Sm^3/d/bar$)	10,7

Table 8.1 Test results.

The pressure quoted above refer to the measurements at the end of the flow period.

8.3 Estimated Pore Pressure, Fracture, Overburden and Temperature Gradients

Pore pressure

The pore pressure in well 30/9-19A are in Shetland Group 1,10 sg and based on well 30/9-19.

Results from MDT measurement, in the Brent Gp, shows that the pressure in top Tarbert 2 is 1.09 sg and decreasing to 1,07sg at 3320mTVD. The gas gradient is 0,025 bar/m and the oil gradient 0,065 bar/m. The water zone in Tarbert 1, at 3320mTVD has a pore pressure of 1, 06 sg. The pore pressure in Ness formation is based on well 30/9-19 and gives a pore pressure at TD of 1,22 sg .

Fracture gradient

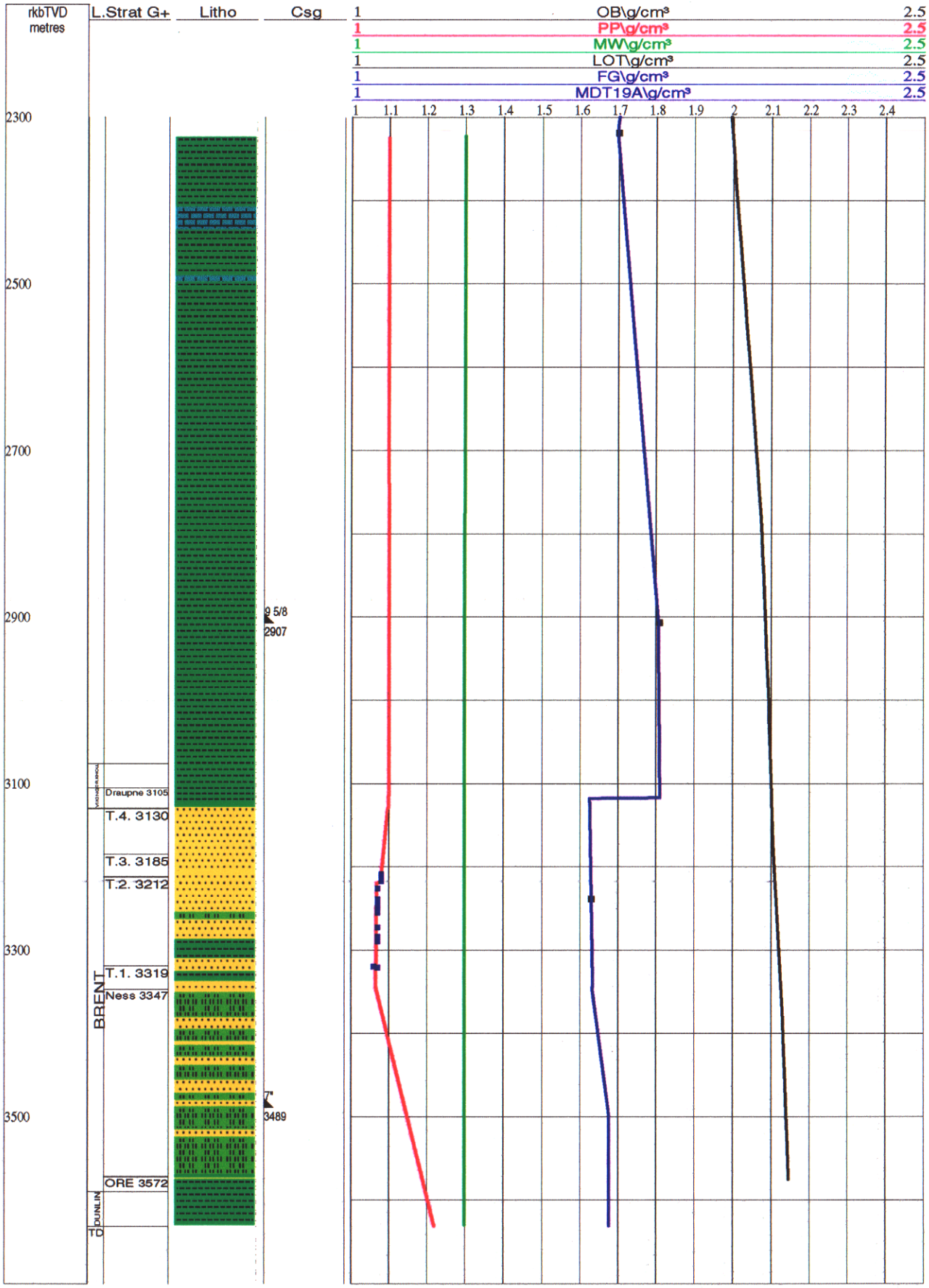
The fracture gradient is adjusted to LOT values. A mini frack test was performed after ended DST and gave a fracture gradient of 1,63sg @ 3239 mTVD

Overburden gradient

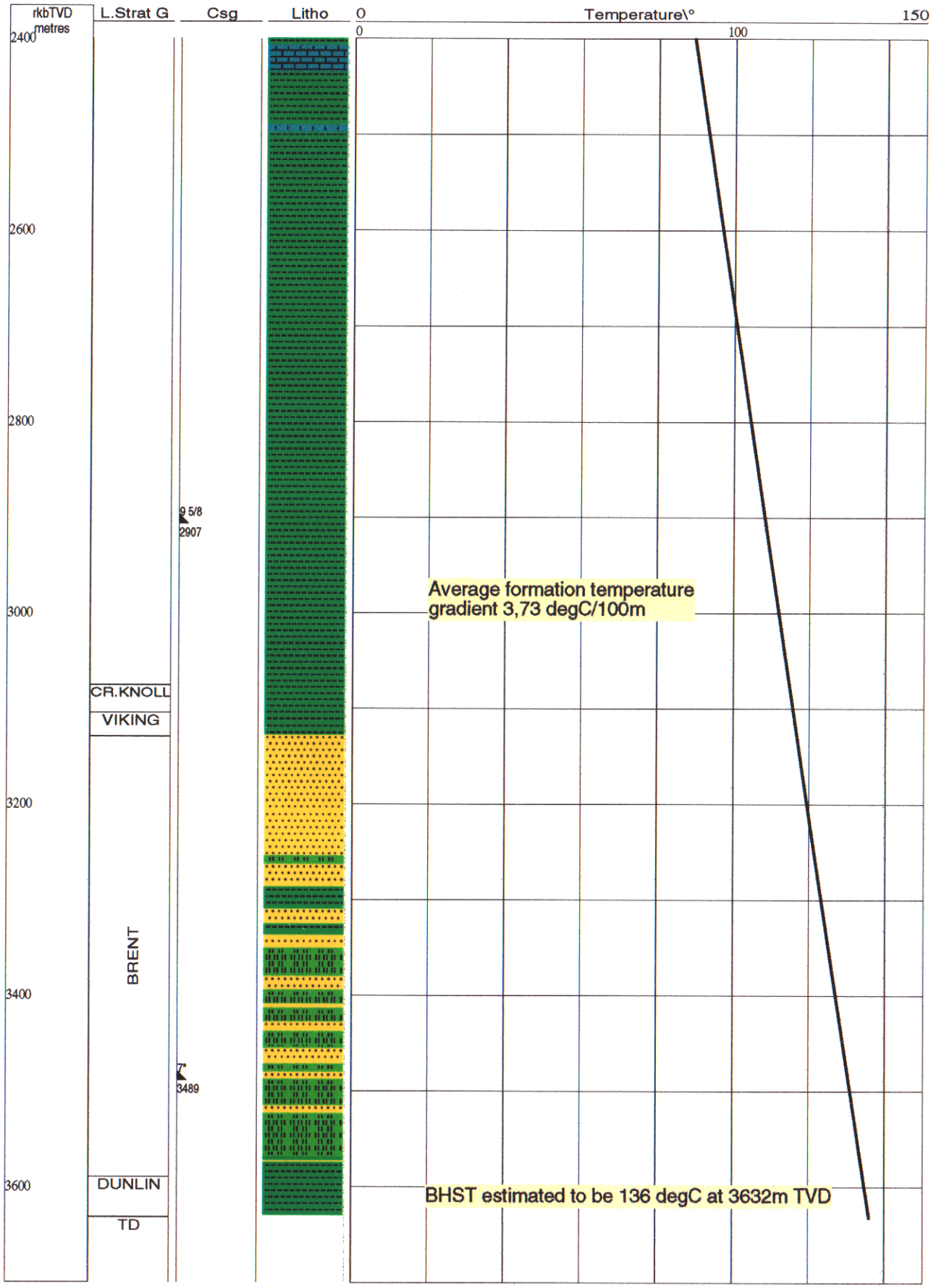
Overburden Gradient is taken from prognosis in Drilling program due to absents of density log above reservoar.

Temperature Gradient

Bottom hole static temperature is taken from DST and measured to 121 deg C from the perforated interval 3242 - 3258 mTVD. The temperaure at TD, 3632m TVDKB, was estimated to 136 deg C with a gradient of 3,73 deg/100m.



Estimated Pore pressure, Fracture and Overburden Gradient



Formation Temperature Gradient

9 GEOPHYSICAL RESULTS

The prognosis for 30/9-19A was based on the results from well 30/9-19. No VSP or check-shots were acquired for this well.

Base Cretaceous was encountered 7 metres shallower than prognosed. The seismic pick was 4 ms to deep because of the uncertainty with respect to the presence of an allochtonous Ness block. The velocity used was correct. The results are presented in Figure 9.1 and Table 9.1.

In the prognosis a seismic event interpreted to represent the base of Tarbert 2 Fm. sand was picked, and the formations between this and base Cretaceous was prognosed based on a geological model.

The base Tarbert 2 reservoir was encountered only 2 metres shallower than prognosed which comfirmed a correct prognosed velocity and pick.

Top Tarbert 2 Fm. was encountered 5 metres shallower than prognosed due to a 3 metres thicker Tarbert 2 reservoir than the geomodel.

Top Tarbert 3 Fm. was encountered 7 metres shallower than prognosed due to a 2 metres thicker Tarbert 3 Fm. than the geomodel.

Top Tarbert 4 Fm. was encountered 9 metres shallower than prognosed due to a 2 metres thicker Tarbert 4 Fm. than the geomodel.

Top Ness Fm. was encountered 3 metres deeper than prognosed. Top Ness was modelled down from the picked base Tarbert 2 reservoir and came in 5 m deeper than the geomodel.

The top ORE Fms. was encountered 23 metres shallower than prognosed which is probably mainly due to a wrong seismic pick.

The top Dunlin Gp. was encountered 31 metres shallower than prognosed. This is also probably mainly due to wrong seismic pick.

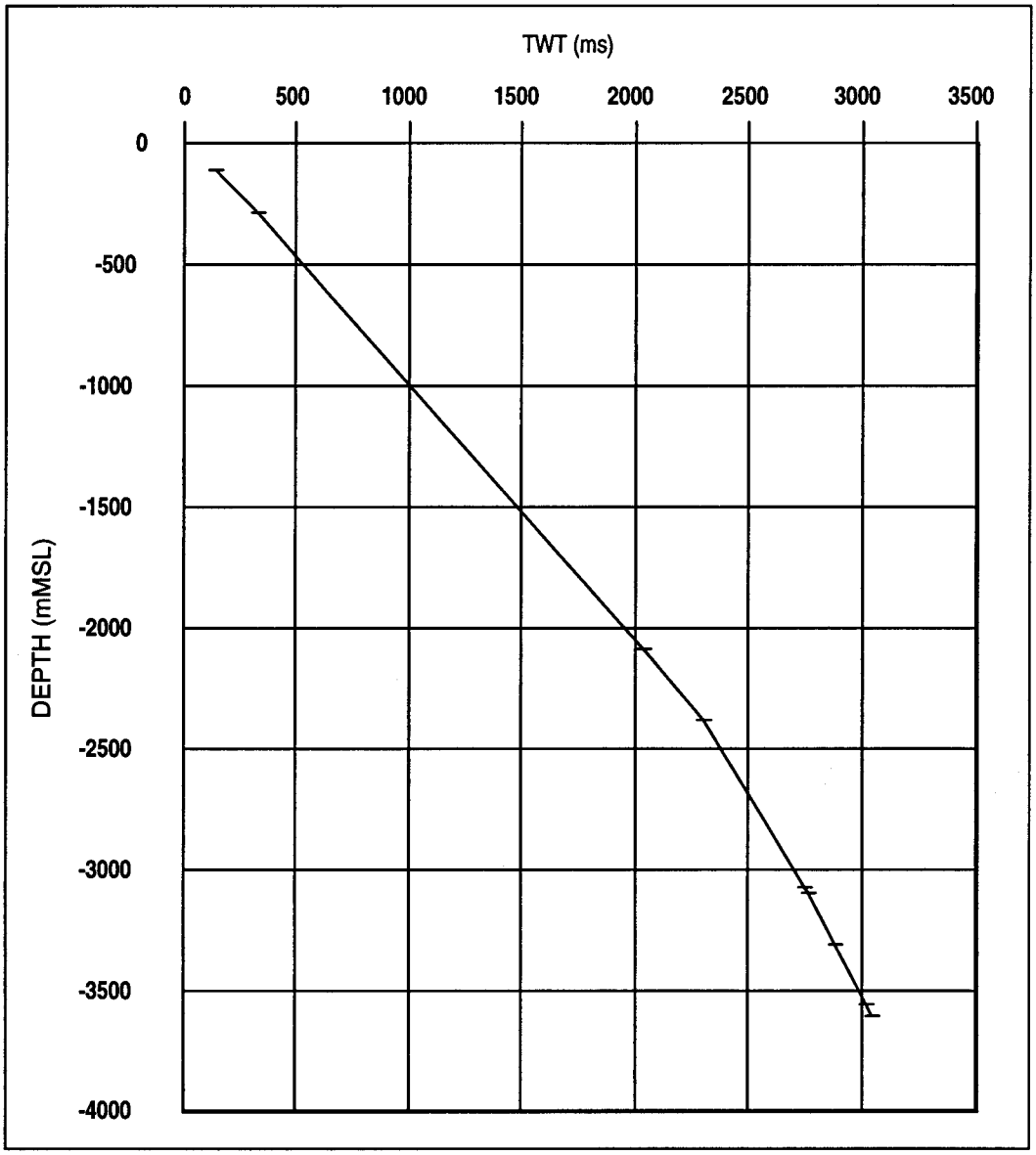


Fig. 9.1 Time / Depth curve

HORIZON	TWT (ms)	Uncert. (ms)	V. Int. (m/s)	Uncert. (m/s)	Depth TVD (m MSL)	Depth TVD (m RKB)	Depth MD (m RKB)	Uncert. (+/- m)	Actual ±	(m RKB), TVD
B.Cretaceous /T.Draupne/ T.Heather	2 752	+25/-10	2 238	50	3 080	3 109	3 187	+45/-20	-7	3 102
B. Draupne/ B. Heather/ T.Tarbert 4	2 769	+25/-10	3 176	50	3 107	3 136	3 218	+45/-20	-9	3 127
Top Tarb. 3	2 797	10	3 786	50	3 160	3 189	3 282	20	-7	3 182
Top Tarb. 2 Reservoir	2 810	10	3 846	50	3 185	3 214	3 311	20	-5	3 209
Base Tarb. 2 Reservoir	2 852	10	3 714	50	3 263	3 292	3 400	20	-2	3 290
Top Tarb. t1	2 864	10	3 667	50	3 285	3 314	3 426	20	2	3 316
Top Ness	2 880	10	3 375	50	3 312	3 341	3 456	20	3	3 344
Top ORE	3 023	15	3 524	50	3 564	3 593	3 745	40	-23	3 570
Top Dunlin	3 036	15	3 846	50	3 589	3 618	3 774	50	-31	3 587
TD					3 632,5	3 661,5	3 824			

Table 9.1: Geophysical summary

10 POST SITE SURVEY REPORT

WELL DATA :

1	**Distance from rig floor to sea level:**	29 m
2	**Water depth (MSL):**	105 m
3a	**Setting depth for conductor (m RKB):**	231 m
3b	**Leak Off / Formation Integrity Test (g/cc):**	N/A
4a	**Setting depth (m RKB TVD) for casing on which BOP mounted:**	1198 m
4b	**Formation Integrity Test (g/cc):**	1.62 sg (LOT)

5 Depth (m RKB (TVD) & Two Way Time) to formation/section/layer tops:

Seabed	:	134.0 m	(141 ms)
Base Pleistocene	:	311.0 m	(327 ms)
Intra Pliocene Anomaly 1 (IPAN1)	:	339.5 m	(357 ms)
Intra Pliocene Anomaly 2 (IPAN2)	:	404.5 m	(427 ms)
Intra Pliocene Anomaly 3 (IPAN3)	:	501.5 m	(522 ms)
Top Early Pliocene Sand (IP3)	:	586.5 m	(606 ms)
Base Early Pliocene Sand (IP3)	:	623.0 m	(627 ms)
Top Usira Sand	:	644.5 m	(642 ms)
Base Usira Sand	:	933 m	(946 ms)
Top Skade	:	977.5 m	(980 ms)
Base Skade	:	998.5 m	(995 ms)
Top Intra Hordaland Sand	:	1070 m	(c. 1060 ms)
Base Intra Hordaland Sand	:	1125 m	(c. 1125 ms)
Top Grid Sand	:	1257 m	(c. 1267 ms)

Note:

No chronostratigraphic information was collected in the tophole section of the well (from seabed down to 1205 m RKB TVD). Consequently, the interpretation of the different formations in this area is based on the MWD logs, seismic character and previous work.

Mud logging commenced at 1205 m. Samples for description were taken at 10 m intervals to 2950 m RKB TVD except for the interval between 2000 m and 2450 m RKB TVD where samples were taken every fifth meter. All formation tops are based upon MWD logs and cuttings analysis.

6 Depth interval (m RKB (TVD) & Two Way Time) and age of sand bodies shallower than 1000 m under the seabed. Note which layers if any contain gas:

No data exists on background gas levels from seabed down to 1205 m (section drilled with returns to seabed). However, no gas-related incidents were reported over this interval.

Several sand bodies have been identified in well 30/9-19:

Pleistocene Interval:

134 m - 217 m
289.5 m - 292 m

Pliocene Interval:

339 m - 340 m
379.5 m - 380.5 m
477 m - 478 m
586.5 m - 623 m

Lower Miocene Interval (Utsira Fm):

644.5 m - 933 m

Oligocene Interval:

954 m - 955 m
967.5 m - 968.5 m
971 m - 973.5 m
977.5 m - 998.5 m
1040 m - 1041 m
1042.5 m - 1044.5 m
1052.5 m - 1055.5 m
1070 m - 1125 m

7 By what means is the presence of gas proven:

An 8 1/2" pilot hole was run from 233 m down to 1202 m to obtain good log quality in response to potential shallow gas between 338 m (IPAN1) and 508 m (IPAN3). No firm clear log indications of shallow gas were recorded, but minor increase in the resistivity response and decrease in the gamma response have been observed at 379.5-380.5 m, 471-474 m, and 477-478 m RKB TVD (see Post Site Survey Log).

Gass bubbles were observed at seabed when circulating 'bottums up' after the drill brake at 413 m RKB TVD. The gas origo is uncertain, but may have been air bubbles created when circulating the Hi-Vis pill.

Below 1205 m RKB TVD gas analyses were accomplished using flame ionisation detectors (FID) with gas measured as percentage methane (C1) equivalent in air, and chromatographic analyses expressed in parts per million.

8 Composition and origin of gas: Methane (C_1)

9 Describe all measurements taken in gas bearing layers: N/A

Chromatographic Breakdown of background Gas:

Depth m RKB MD	Background %	Composition
1205-1610	0-0.01	C_1
1610-1800	0.03-0.25	C_1-C_2 to C_3

SEISMIC DATA:

10 Given depth (m RKB & ms TWT) and extent of sand layers (communication, continuity, truncation etc.):

Pleistocene Interval:

134 m - 217 m: Laterally extensive channel sand covering the eastern part of block 30/8 and western part of blocks 30/6 and 30/9.

289.5 m - 292 m: Thin sand found within well stratified unit near Base Pleistocene. The sand unit extends across entire survey area and a similar sand layer was recorded in the 30/8-3 tie well. The sand is thought to have good continuity.

Pliocene Interval:

339 m - 340 m
379.5 m - 380.5 m
477 m - 478 m
586.5 m - 623 m Laterally extensive sand layer

Lower Miocene Interval (Utsira Fm):

644.5 m - 933 m Laterally extensive sand layer

Oligocene Interval:

954 m - 955 m
967.5 m - 968.5 m
971 m - 973.5 m
977.5 m - 998.5 m Laterally extensive sand layer
1040 m - 1041 m
1042.5 m - 1044.5 m
1052.5 m - 1055.5 m
1070 m - 1125 m

11 Given depth and extent of any gas blanking ("gass-skygging"), seismic anomalies etc.:

Amplitude anomalies indicative of shallow gas were mapped at three levels in the area of well 30/9-19:

IPAN1: 338 m ± 20 m RKB TVD, no anomaly segments close to the well location.
IPAN2: 406 m ± 30 m RKB TVD, minor segment approximately 10 m south-east of the well location.
IPAN3: 508 m ± 36 m RKB TVD, 200 m south-west of the well location

Based on experience from wells 30/8-3, 30/5-2 and 30/9-2 wek gas warnings were given for the three levels at the planned well 30/9-19 location.

Due to shallow gas warning a 8 1/2" pilot hole was drilled to 1202 m. The tophole section of the well was drilled with returns to seabed to 1205 m RKB TVD. Background gas levels were consequently not monitored. No firm clear log indications of shallow gas were recorded.

12 Note any indication of gas originating from deeper levels. Give description in cases where gas comes from deeper layers: N/A

13 How does the interpretation of the site survey correspond to the well data with respect to:

13a Shallow Gas:

Due to shallow gas warning, a 8 1/2" pilot hole was drilled from 233 m down to 1202 m. The tophole section of the well was drilled with returns to seabed to 1205 m RKB TVD. Background gas levels were consequently not monitored. No firm clear log indications of shallow gas were recorded, but minor increase in the resistivity response and decrease in the gamma response have been observed at 379.5-380.5 m, 471-474 m, and 477-478 m RKB TVD (see Post Site Survey Log).

Gass bubbles were observed at seabed when circulating 'bottums up' after the drill brake at 413 m RKB TVD. The gas origo is uncertain, but may have been air bubbles created when circulating the Hi-Vis pill.

No gas-related problems were experienced in the well.

13b Sand Bodies:

The Pleistocene sand layers were predicted, but the deepest layer (289.5 m - 292 m) was not annotated with exact depth. The encountered sand layers correspond with the interpretation.

One of the three predicted thin sand layers (IPAN1) in the Pliocene section were observed. The predicted sand layer at IPAN3 represents most likely a silty mud/mudstone. The thick Early Pliocene sand layer at 586.5 m to 623 m appeared 13.5 m thicker than predicted.

The Utsira Sand occurred as predicted but due to the seismic pick and correlation to tie-well 30/6-18, the Top Utsira Sand is placed 7.5 m deeper and the Base Utsira Sand is

placed 8 m shallower than indicated in the Formation Tops prognoses. The upper part of the Utsira Sand is interpreted as being a transitional zone which grades into silt and clay as the overlaying sequence is approached.

The sandy Skade Formation occurred as predicted, but the formation appeared 6 m thicker than predicted. The reason for this is probably wrong seismic picks of the formation boundaries.

The sand layer in Oligocene at 1070 m to 1125 m was not predicted.

13c Boulders:

Scattered boulders were predicted in the shallow section between approximately 223 m and 282 m RKB TVD. No boulders layers were observed in the predicted interval, but boulders were encountered between 217 m and 231 m RKB TVD.

13d Unconformities (depths in metres RKB (TVD)) :

Horizon		Prognosed	Observed	Difference
Seabed	:	134 ± 1	134	0
Base Pleistocene	:	309 ± 17	311	2 (deeper)
Top Early Pliocene Sand	:	598 ± 38	586.5	11.5 (shallower)
Base Early Pliocene Sand	:	621 ± 39	623	2 (deeper)
Base Pliocene	:	637 ± 40	644.5	7.5 (deeper)
Base Utsira	:	941 ± 50	933	8 (shallower)
Top Skade	:	980 ± 53	977.5	2.5 (shallower)
Base Skade	:	995 ± 61	998.5	3.5 (deeper)
Top Intra Hordaland s.	:	1284 ± 69	1070	214 (shallower)
Base Intra Hordaland s.	:	1338 ± 75	1125	213 (shallower)
Top Grid	:	1412 ± 90	1257	155 (shallower)

The differences between the prognosed and observed depths to different formation tops were within the uncertainty limits, except for Top/Base Intra Hordaland Sand and Top Grid Fm. The difference between the predicted and observed depths are most likely due to wrong seismic picks. The seismic interpretation work in this area is very much hampered by diapirs that occur in the Oligocene section.

13e Correlation to Nearby Wells:

In general, the drilling conditions experienced in well 30/9-19 are as predicted and similar to those encountered in tie-wells 30/8-3 and 30/9-2.

11 STANDARD AND SPECIAL STUDIES

- **Norsk Hydro, 1999:** Petroleum Geochemistry of Well 30/9-19A
- **Anadrill Schlumberger, 1998:** End of Well Report, 30/9-19A
- **Norsk Hydro, 1999:** Wax Precipitation on Stabilized Fluid from 30/9-19A
- **Norsk Hydro, 1999:** Standard Core Description well 30/9-19A
- **Oilphase, 1999:** Core Photographs, well 30/9-19A
- **Oilphase, 1999:** Conventional Core Analysis, well 30/9-19A
- **Geoservice, 1998:** Final Well Report for well 30/9-19A
- **Institutt for Energiteknikk, 1999:** Datareport on Stable Isotopes, Gas samples from well 30/9-19A
- **Institutt for Energiteknikk, 1999:** Datareport on Molecular and Stable Isotope composition of Headspace gas from well 30/9-19A
- **Anchor Drilling Fluids, 1999:** Final well report 30/9-19 - Fluid Summary

APPENDIX I

CORE DESCRIPTIONS

CORE REPORT

WELL: **30/9 - 19A** DATE: 16.11.98 GEOL: B. Schønningsen/J.R. Eide SCALE: 1:200

CORE NO: 1 FROM: 3300 m TO: 3332 m CORED: 3300 - 3342 m(42m) REC: 3300-3341.5 m (98.8%)

Depth m RKB	Rec.	Lith.	Grain Size (cly sl vf f m c vc)	Lithological Description	Flu (tr m g)	Cut (tr m g)	Shows description
3300				**Sltst:** dusky yel brn-olv blk, mod hd-hd, fri, blky, non calc, v mic arg, com micropyr.			**Shows:** wk pet od, no oil stn, no dir fluor, pr-slo blmg dull bl wh fluor cut, no vis cut, pr dull bl wh even fluor res, no-pr yel ring vis res.
				Sst: olv gry-dusky yel brn, clr trnsl Qtz, vf-f, pred vf, sbang sbrndd, v srt, hd, mic, micropyr, sli calc, sil cmt, sli slty, arg, r glauc, r carb mat, no vis por			
3305							
				Sst: olv gry-dusky yel brn, clr trnsl Qtz, vf-f, pred f, Tr m, sbang-sbrndd, mod srt, hd, r mic, r micropyr, r carb mat, sli calc, sil cmt, r glauc, r arg mat, pr vis por			**Shows:** mod strg pet od, no oil stn, no dir fluor, slo blmg dull bl wh fluor cut, no vis cut, pr dull bl wh even fluor res, no vis res.
3310							
				Sst: olv gry-dusky yel brn, clr trnsl, Qtz, f-v crs, pred crs, sbang - sbrndd, mod - v srt, frm-mod hd, r pyr, sil cmt, sli calc, r carb mat, mod vis por			
3315							
							no shows at 3318 m
3320							
							no shows at 3324 m
3325							
3330							
3332							

CORE REPORT

WELL: **30/9-19A** DATE: 16.11.98 GEOL: B. Schønningsen/J.R. Eide SCALE: 1:200

CORE NO: 1 FROM: 3332 m TO: 3341.5 m CORED: 3300 - 3342 m (42 m) REC: 3300 - 3341.5 m (98.8%)

Depth m RKB	Rec.	Lith.	Grain Size cly sl vf f m c vc	Lithological Description	Flu tr m g	Cut tr m g	Shows description
3332				**Sst:** olv gry-dsky yel brn, clr-trnsl Qtz, f-v crs, pred m-crs, sbang-sbrndd, mod-w srt, mod hd-hd, r pyr, sil cmt, r calc, r carb mat, mod vis por			**Shows:** mod strg pet od, no oil stn, no dir fluor, slo blmg dull bl wh fluor cut, no vis cut, pr dull bl wh even fluor res, no vis res
3335							
3340							
3341.5							no shows at 3341.5 m

APPENDIX II

WELL SUMMARY

GEOLOGICAL WELL SUMMARY

MDT RESULTS

WELL SUMMARY:

Coord: 60°27'35.38"N 02°41' 38.94" E **UTM:** 6 702 819.9mN 483 176.9mE
Zone: ED50, UTM Zone E 31, CM3° E

Line: NH9201 inline 439 x-line 1341

Rig: West Delta

Waterdepth: 105 m MD

Stopped in: Dunlin Gp

On location: 06.09.98
Spudded: 24.10.98 on cost
At T.D.: 18.11.98
Completed: 22.12.98
T.D. Driller: 3775 m
T.D. Logger: 3778 m
Wireline Logging: Schlumberger
Mudlogging: Geoservice

WELL:
30/9-19A

COUNTRY
Norway

OPERATOR Norsk Hydro **LICENCE** PL169

OWNED BY:

TARGETS
Primary: Tarbert FM
Secondary: ORE FM.

RESULTS

Gas and oil discovery in Tarbert 2

CASING

30" 231 m MD
20" 1198 m MD
13 3/8" 2318,5 m MD
9 5/8" 3187 m MD

CORES

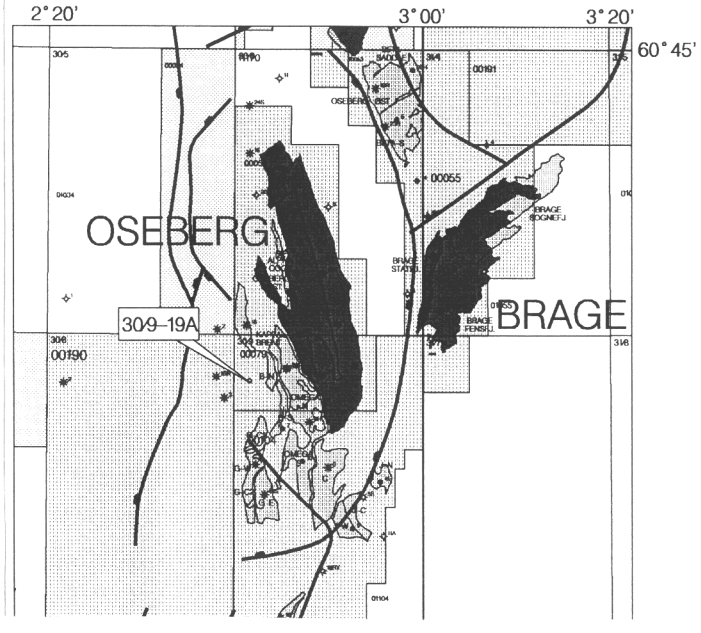
Core # 1
3300-3342m

Recovered
3300-3341.5m

98.8%

GAS RECORD

2323-2349 m	0.04 - 0.16	C1 - nC4
2349-2410 m	0.06 - 0.24	C1 - nC4
2410-2428 m	0.03 - 0.10	C1 - nC4
2428-2468 m	0.04 - 0.17	C1 - nC4
2468-2558 m	0.08 - 0.30	C1 - nC4
2558-2752 m	0.08 - 0.20	C1 - nC4
2752-2867 m	0.07 - 0.22	C1 - nC4
2867-2960 m	0.12 - 0.67	C1 - nC5
2960-3075 m	0.13 - 0.70	C1 - nC5
3075-3102 m	0.28 - 0.69	C1 - nC5
3102-3159 m	0.13 - 0.25	C1 - nC5
3159-3179 m	0.14 - 0.25	C1 - nC5
3179-3197 m	1.37 - 2.43	C1 - nC5
3197-3300 m	1.1 - 10.2	C1 - nC5
3300-3530 m	0.9 - 7.8	C1 - nC5
3530-3775 m	0.4 - 7.2	C1 - nC5



LOGS

MWR - DIR
2240 - 3773 m

MWR - CDR
2323 - 3766 m

PEX
(HALS-TLD-HGNS-GPIT-AMS)
3778 - 3133 m

MDT pressure points
3448 - 3278.5

MDT samples
3442 + 3359 + 3331.5 m

OIL SHOWS

3300 - 3340 m: On Sst (Core): wk - mod pet od, no oil stn, no dir fluor, pr-slo blmg dull bl wh fluor cut, no vis cut, pr dull bl wh even fluor res, no vis res.

3350 - 3365 m: On lse Sd gn: no oil stn, spotty dull - pt bri yel dir fluor, slo strmg bl wh-yel wh wk fluor cut, no vis cut, wk bl wh fluor res, no vis res.

GEOLOGICAL WELL SUMMARY

DEPTH m MD RKB	LITHO SECTION	SYSTEM	SERIES/STAGE	GROUP	FORMATION	DESCRIPTION	SHOWS

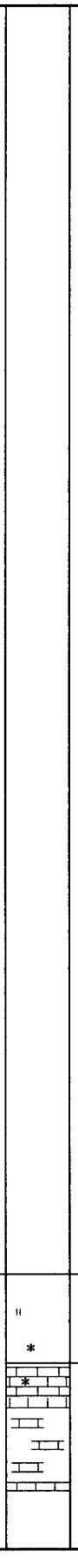
Located on:
60° 27' 35.38"N
02° 41' 38.94"E

Inline 439
x-line 1341

Water depth: 105 m MD

KB = 29 m

WELL **30/9-19 A**



Kick off well 30/9-19 A from 2313 m

Clst: dk olv gry, firm, non calc, sli slty, glau

2395 m
2410 m (2409.5)

Ls: wk, crp-microxln cln, pt tr-com glau

2440.5 m (2438 m)

Clst: olv gry-olv blk, sft, sli-v calc Tr glau/carb, r pyr.

Ls: wk, crp-microxln, cln r glau

GEOLOGICAL WELL SUMMARY

Located on:
60° 27' 35.38" N
02° 41' 38.94" E

Inline: 439
x-line: 1341

Water depth: 105 m MD KB = 29 m

WELL **30/9-19 A**

RKB: 23.5 m

DEPTH m MD RKB	SYSTEM	SERIES/STAGE	GROUP	FORMATION	DESCRIPTION
2500	CRETACEOUS	UPPER CRETACEOUS	SHETLAND	JORSALFARE	
2550					
2600					
2650				KYRRE	2659 m (2654.5 m) **Clst:** olv gry-olv blk, gnsh gry,sft-frm, sol, sbblky-amor, mod-v calc, slty, Tr-com glauc, loc Tr euhd pyr, Tr carb mat
2700					
2750					
2800					**Ls:** r lt gry, pl yel brn, mod hd, brit-fri, blky-plty, micro-loc crpxln, pt **dol:** dusky yel brn, hd, brit, blky, microxln
2850					
2900					
2950					
3000					
3050					
3100				TRYGGV.	3062 m (3006.5 m) **Clst:** olv gry, sft-frm, sol, amor-sbblky, mod-v calc, sli slty, Tr Glauc/Carb, r micropyr, v r pyr.
3150		Low Cret	Cr. Kn.	Rød	3140 m (3071 m) **Clst:** mod brn,sft, frm, amor-sbblky, non calc, sli slty, micropyr.
3200			Viking	Dr. He.	3179 m **Clst:** gry blk-brn blk, mod hd-frm, blky, brit-fis, sli-mod calc, micro-mic, micropyr, carb mat
3250			BRENT	TARBERT 4	3210 m (3133 m) **Sst:** olv gry-m dk gry, clr-trnsl Qtz, vf-f, occ m, sbang-sbrnd, mod-w srtd, mic, pyr, r glauc, sl slty, sli-v calc, r arg mtx.
3300				T.3	3277 m (3182 m)
3350				TARBERT 2	3310,5 m (3209.5 m) **Sst:** olv gry-dusky yel brn, clr-trnsl Qtz, vf-f, pred f, sbang-sbrndd, w srt, hd, mic, micropyr, sli calc, sil cmt, sli slty, arg, r glauc, r carb mat, no-mod vis por **Shows:** mod-strg pet od, no oil stn, spotty dull-bri yel dir Fluor, slo strmg bl wh-yel wh fluor cut, no vis cut, wk bl wh fluor resd, no vis resd.
3400					
3450				T.1	3440,5 m (3316 m) **Sst:** lt gry, lt brn gry, clr-trnsl Qtz, f-m, tr crs, pred lse,sbang-sbrndd, pr-
3500				NESS	3472.5 m srtd, Tr Mic, Tr Pyr, sli calc **Sst:** lt gry, lt brn gry, clr-trnsl Qtz, mky Qtz, vf-m, tr crs, lse sbang-sbrndd, pr-w srt, Tr Mic, Tr Pyr, Tr carb mat. **Clst:** olv blk-olv gry, brn blk, mod hd-frm, blky, micromic-mic, micropyr, Pyr, non calc, Tr carb mat, slty.
3550					
3600					
3650					
3700				ORE	3711.5 m (3588 m) **Sst:** lt gry, pred clr-mlky wh Qtz, f-crs, Tr v crs, pred lse, sbang-sbrndd, pr srtd Tr Mic.
			D	D	

SHOWS	DUNLIN	DRAKE	
		ore	3711.5 m (3570 m) 3730 m (3588 m) **Clst:** olv blk-brn blk, frm-blky, non calc, sli-non slty, Tr micropyr, r micromic, sli carb. 3775 m (3631.7 m)
3750			
3800			
3850			
3900			
3950			
4000			
4050			
4100			
4150			
4200			
4250			
4300			
4350			
4400			
4450			
4500			
4550			
4600			
4650			
4700			
4750			
4800			
4850			
4900			
4950			

FORMATION PRESSURE WORKSHEET

Well Name : 30/9-19A **Rig :** West Delta **Date :** 20.11.98

Pressure Units : Bars **RKB-MSL :** 29 m. **MSL-SBed:** 105 m. **Witnessed by :** Eide/Vik

Run No./ Test No.	Depth	Depth	Initial Hydrostatic Pressure		Formation Pressure		Final Hydrostatic Pressure		Time hh:mm		Formation Pressure	Test Temp	Good Data?	Sample Information			Remarks
	mMDRKB	mTVD RKB	Strain	HP	Strain	HP	Strain	HP	Set	Retract	sg EMD	degC	Y/N	Main Fluid Type	HC Gravity g/cc	Sample Vol, cc	
1A/1	3278,0	3182,2	405,10	405,010	346,30	346,450	405,05	405,070	11:40	11:48	1,11	96,5	N ?	Gas ?			Mob=0.1 Tight / SF ?
1A/2	3279,0	3183,3	405,60	405,580	NA	NA	404,84	404,950	11:55	12:02	NA	99,5	N	Gas ?			SF
1A/3	3311,0	3209,1	408,40	408,440	339,43	339,420	408,16	408,150	12:24	12:26	1,08	104,6	Y	Gas			Mob= 189,1
1A/4	3313,0	3210,8	409,30	409,110	339,48	339,450	408,48	408,480	12:32	12:34	1,08	106,0	Y	Gas			Mob= 385,3 (20.11.98)
	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	MDT communication failure
1A/5	3321,0	3217,3	408,20	408,310	339,60	339,620	408,00	408,050	05:22	05:24	1,08	112,5					Mob= 13,8 (21.11.98)
	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	x	MDT communication failure
1A/6	3331,5	3225,8	402,46	402,526	339,81	339,805	402,33	402,310	21:17	21:21		115,6	Y	Gas		20 cc	Mob= 265,5
1A/7	3342,5	3234,6	399,96	400,030	224 plus	224 plus	NA	NA	21:35	21:37		NA	N	Gas		5,3 cc	Mob= 17,4 Tight
1A/8	3343,0	3235,0	401,33	401,380	401,00	401,000	NA	NA	21:58	22:05		116,4	N	Gas		20 cc	Seal failure
1A/9	3348,0	3239,3	401,79	401,880	340,30	340,352	402,21	402,340	22:14	22:18		116,7	Y	OIL		20 cc	Mob= 75,6
1A/10	3354,0	3244,2	403,05	403,147	340,58	340,612	403,17	403,248	22:31	22:36		117,1	Y	OIL		20 cc	Mob= 20,4
1A/11	3359,0	3248,1	403,66	403,760	340,86	340,908	404,03	404,090	22:50	22:55		117,5	Y	OIL		20 cc	Mob= 7,4
1A/12	3360,0	3248,9	404,12	40,195	340,88	340,929	404,34	404,480	23:07	23:11		117,7	Y	OIL		20 cc	Mob= 42,8
1A/13	3363,0	3251,8	404,43	404,534	341,20	341,241	404,73	404,837	23:26	23:34		118,0	Y?	OIL		20 cc	Mob= 9,7 Supercharge ?
1A/14	3363,0	3251,8	404,86	404,720	341,21	341,259	405,07	405,183	23:38	23:47		118,2	Y?	OIL		20 cc	Mob= 9,1 Supercharge ?
1A/15	3367,0	3254,7	405,43	405,549	341,28	341,328	405,56	405,666	00:07	00:11		118,4	Y	OIL		20 cc	Mob= 175,8 (22.11.98)
1A/16	3370,0	3257,1	405,17	405,228	342,18	342,150	405,43	405,551	00:36	00:44		118,6	N?	Water		3,0 cc	Mob= 1,7 Tight/Superch ?

Note: Depth control 3278.0m to 3331.5m on wireline. Remainder of points based on pipe measurements

NB: Fmtn Press sg calculated from RKB

SECTION B

OPERATIONS

Prepared by: Ivar Vee Aune Verified by: Thor Andre Løvoll Approved by: Tor Johan Skakstad

LIST OF CONTENTS

		Page
1	DRILLING SUMMARY AND EXPERIENCES	B-3
1.1	12 1/4" Hole Section / 9 5/8" Casing	B-3
1.2	8 1/2" Hole Section / 7" Liner	B-3
1.3	Testing	B-4
1.4	Plug and Abandonment	B-5
1.5	Demobilising	B-5

TABLES

General Information on Well	B-6
Final Cost Reports	B-7
Down Time Report	B-8
Daily Report	B-10
Time Distribution	B-25
Hole Deviation	B-27
Main Consumption of Casing/Tubing	B-31
Bit Record	B-32
Bottom Hole Assemblies	B-33
Cement Slurry Report	B-38
Cement Consumption Per Job	B-40
Total Consumption of Cement Additives	B-41
Daily Mud Properties: Rheology Parameters	B-42
Daily Mud Properties: Other Parameters	B-45
Total Consumption of Mud Additives	B-48

FIGURES

B-1 Pore Pressure, Mud Density, Fracture and Overburden Gradients	B-50
B-2 Temperature Gradient	B-51
B-3 Formation Strength Test Report	B-52
B-4 Time Distribution	B-53
B-5 Actual Drilling Curve	B-54
B-6 Well Status After Abandonment	B-55
B-7 Anchor Pattern	B-56

1 DRILLING SUMMARY AND EXPERIENCES

1.1 12 1/4" Hole Section / 9 5/8" Casing

Total depth of section: 3187.0 mMD.

Total time used:	484.5 hrs
Operational time:	386.5 hrs (79.8 %)
Downtime:	98.0 hrs (20.2 %)

For a detailed breakdown, see report 5-21

1.1.1 Drilling

The first attempt to kick off from 30/9-19 was unsuccessful. The bit ended up landing on the remains of the 9 5/8" casing.

A new kick off plug was set from 2372 to 2273 mMD. A milled tooth bit was used for the second attempt to kick off. The motor bend was increased and a single shot gyro was run to provide azimuth readings. The bit was pulled at 2428 mMD after having kicked off successfully and built angle to 7 deg.

A PDC bit was run to ensure high ROP. It was pulled at 2522 mMD due to no steerability in the Shetland formation.

A new insert was chosen. Inclination was increased to 32 degrees, but the ROP was so low it was decided to try a PDC bit again. This bit dropped more than 1/2 degree per stand. Steering was impossible. The bit was pulled. A closer look at the motor showed that a nozzle in the rotor had been washed out. This had resulted in a diversion of the mud flow to the inside of the rotor which in turn resulted in the motor not being able to rotate while at bottom. The motor failure was the reason for the steering problems.

An insert bit drilled the remaining of the section to TD at 3187 mMD/3116 mTVD. A wiper trip was performed.

1.1.2 Casing

The 9 5/8" casing was run according to the program and pressure tested to 417 bars.

1.2 8 1/2" Hole Section / 7" Liner

Total depth of section: 3768.0 mMD.

Total time used:	303.0 hrs
Operational time:	236.0 hrs (77.9 %)
Downtime:	67.0 hrs (22.1 %)

For a detailed breakdown, see report 22-36

1.2.1 Drilling

A used PDC bit was run down to the coring point at 3300 mMD. High ROP was achieved.

After coring to 3342 mMD a new PDC bit of the same type as the previous one was run. TD was set at 3775 mMD which is 52 mMD into the Dunlin formation.
A wiper trip was performed after the MDT logging

1.2.2 Coring

One core was cut in the Tarbert 2 sand.

Run #	Cored interval [mMD]	ROP [m/h]	Recovery [%]	Reason pulled
1	3300.0 - 3342.0	38.9	98.8	Core jammed

1.2.3 Logging

The following logs were run:

Log suite	Logged interval [mMD]	Comments
PEX	3187.0 - 3775.0	
FMI, DSI, GR, AMS	3187.0 - 3280.0	Could not pass 3280
MDT	Reservoir section	Samples and press. points
FMI, DMS, CMR	3187.0 - 3202.0	Could not pass 3202
DSI, GR, AMS	3187.0 - 3775.0	
CMR, GR, AMS	3275.0 - 3460.0	

The PEX logging suite consisted of HALS, TLD, HGNS, GPIT and AMS.

The MDT tool was first run on wireline. After having been stuck at 3204 mMD and lost communication with the tool, it was decided to run it on TLC. Even when running on TLC, communication with the tool was lost three times. Because of wire damage, slip and cut had to be performed. TLC was performed during with large heave motions on the rig, and these problems were therefore experienced.

1.2.4 Liner

The liner shoe was set at 3772 mMD, and top PBR at 3032 mMD. The liner was rotated during cementing, and a CBL log confirmed good cement job. The liner hanger packer and 9 5/8" annulus was pressure tested to 200 bars.

1.3 Testing

Total time used: 331.5 hrs
Operational time: 274.0 hrs (82.7 %)
Downtime: 57.5 hrs (17.3 %)

For a detailed breakdown, see report 36-47

After cleaning up the 7" liner a EZSV plug was run and set at 3405 mMD. The main test string was run with the perforating guns. A GR/CCL log was run to confirm TCP and packer setting depth.

The well was perforated in a 16 meter interval just under the gas cap from 3348 to 3364 mMD. Afterwards the well was opened for the clean up flow.

The well was closed in for a first build-up period, then opened for the 24 hour main flow period. The flow rate achieved was higher than expected. The following main build-up period lasted for 12 hours.

A BHS was run, and BHS flow test and build-up was performed.

After finishing the well test, a minifrac test was performed, and the well was killed with mud prior to pulling the test string.

1.4 Plug and Abandonment

Total time used:	175.0 hrs
Operational time:	156.0 hrs (89.1 %)
Downtime:	19.0 hrs (10.9 %)

For a detailed breakdown, see report 47-55

After killing the well, it was plugged back. An EZSV with bridge plug was set in the 9 5/8" casing at 3333 mMD. It was tagged and pressure tested to 219 bars, and a 400 m cement plug was placed on top of it. The 9 5/8" casing was cut at 2162 m and pulled.

An EZSV without bridge plug was set in the 13 3/8" casing at 2158 mMD. It was pressure tested to 165 bars. 100 meters of cement was left on top of it. The 13 3/8" casing was cut at 652 mMD.

A Parabow was set at 603 m in the 20" casing and a cement plug was set on top of it to 408 mMD. The plug was tagged with 8 mT and pressure tested to 110 bars. The 20" and 30" casings were cut at 141 m and pulled together with the retrievable guide base.

1.5 Demobilising

Total time used:	10.0 hrs
Operational time:	0.0 hrs (0.0 %)
Downtime:	10.0 hrs (100.0 %)

For a detailed breakdown, see report 55.

Waited on weather for ten hours before starting anchor handling prior to leaving the 30/9-19 A location.

GENERAL INFORMATION ON WELL 30/9-19 A

Field : OSEBERG **Country :** NORWAY
Licence : 79
UTM zone : 31 **Central Median :** 3° E **Horiz. Datum:** ED50

Location coordinates:		Surface	Target
UTM	North [m]:	6702819.9	6702818.0
UTM	East [m]:	483176.9	482566.0
Geographical	North :	60 27'35.39"	
Geographical	East :	02 41'38.94"	

Water Depth: 105.0 m **Reference Point Height:** 29.0 m
Formation at TD: No formation data found.

Operators: NORSK HYDRO PRODUKSJON A/S **Share:** 16.00 %

Partners: DEN NORSKE STATS OLJESELSKAP A/S **Share:** 73.50 %
SAGA PETROLEUM A/S 10.50 %

Total depth (RKB) : 3775.0 m MD 3631.7 m TVD

TIME SUMMARY
Start Time : 1998-10-24 07:00:00
Spudding date : 1998-10-30
Abandonment date : 1998-12-16

Main operation	Hours	Days	%
DRILLING	497.5	20.7	38.2
FORMATION EVALUATION LOGGING	92.5	3.9	7.1
FORMATION EVALUATION CORING	32.5	1.4	2.5
TESTING (PRODUCTION TEST)	274.0	11.4	21.0
PLUG AND ABANDONMENT	156.0	6.5	12.0
DOWNTIME MOBILIZATION	10.0	0.4	0.8
DOWNTIME DRILLING	108.5	4.5	8.3
DOWNTIME FORM. EVAL. LOGGING	56.0	2.3	4.3
DOWNTIME FORM. EVAL. CORING	0.5	0.0	0.0
DOWNTIME TESTING (PROD. TEST)	57.5	2.4	4.4
DOWNTIME PLUG AND ABANDONMENT	19.0	0.8	1.5
Sum:	**1304.0**	**54.3**	

Hole and casing record

Hole	Track	Depth [m MD]	Casing/Tubing	Track	Depth [m MD]
36"		231.1	30"		231.0
26"		1202.0	20"		1198.0
17 1/2"		2400.0	13 3/8"		2318.5
12 1/4"		3197.0	9 5/8"		3187.0
8 1/2"		3775.0	7"		3768.0

Well status: PERMANENTLY ABANDONED

Rig name: WEST DELTA

NORSK HYDRO
DRIFT/BORESEKTOR

DRILLING

WELL	: 30/9-19A			
[redacted]ICENS	: 079			
[redacted]IG	: West Delta			
RIG RATE	:	$140 000	$140 000	$140 000
DEPTH IN METER	:	3 484	3 824	3 775
EXCHANGE RATE USD 1=	:	NOK 7,6	NOK 7,6	NOK 7,6
DAYS	:	21,5	34,9	40,5
DATE OF REPORT	:	15.10.98	09.11.98	01.06.99

ESTIMATED COSTS (IN 1.000 NOK)	APPR.AFE NO. 1	APPR.AFE NO. 2	ESTIMATED FIN.COSTS
0 EMPLOYEE RELATED COSTS	**1 935**	**3 141**	**1 840**
1 RIG COSTS	**22 876**	**37 134**	**39 957**
2 RIG SUPPORT COSTS	**2 967**	**4 594**	**6 077**
3A Fuel/lub.	710	1 152	463
3C Bits	2 189	3 131	1 461
3D Casing/casing equipment	1 674	1 749	1 723
3E Wellhead	189	246	334
3[redacted]ement/cement additives	697	637	381
3G Mud/mud chemicals	1 088	1 296	1 591
3 CONSUMABLES COSTS, SUB TOTAL	**6 547**	**8 211**	**5 953**
4E Fix. wing transportation	0	0	0
4C Other transportation	43	35	60
4D Standby vessel	1 135	1 843	1 638
4F Helicopter transportation	645	1 047	1 019
4G Supply vessels	2 018	3 023	2 106
4 TRANSPORTATION COSTS, SUB TOTAL	**3 841**	**5 948**	**4 823**
5A Coring	897	897	369
5B Drilling	760	950	364
5C Cutting of casing/Fishing equipm.	850	350	314
5D Completion services	0	0	0
5F MWD-services	1 029	1 578	2 372
5G Casing Services	500	500	873
5[redacted]Mud logging/MUD SERVICES	672	997	1 019
5[redacted]ement/press.test	409	663	878
5J Electrical logging	2 457	2 457	3 667
5K VSP	0	0	-1
5L Prod. testing	108	176	190
5M Diving/ROV	410	551	342
5N Misc. rental & op.costs	903	1 465	1 176
5 SERVICE COSTS, SUB TOTAL	**8 995**	**10 584**	**11 563**
6A Site survey	0	0	0
6B Rig positioning	0	0	0
6C Drilling site clean up	0	0	0
6 SURVEY COSTS, SUB TOTAL	**0**	**0**	**0**
7 WAREHOUSE COSTS	**473**	**768**	**642**
TOTAL OPERATION COSTS	**47 633**	**70 379**	**70 855**

[redacted]

Downtime report, 30/9-19 A

Well	Rep	#	Hrs	Date	Downtime Type	Short Description	Responsible Contractor	Nsfi Type	Equipment Type	Service Type
30/9-19 A	2.		5.0	1998-10-26	Equipment failure	Builded scaffolding at monkey board	SMEDVIG OFFSHORE A/S	Other Service Equipment/System	SERVICE EQUIPMENT/SYSTEMS	RIG UTILITIES
	3.		25.5	1998-11-01	Equipment failure	Dismantling elmagco brake shaft and bearing	SMEDVIG DRILLING A/S	Other Hoisting Equipment	HOISTING EQUIPMENT	DRILLING CONTRACTOR
	4.		1.5	1998-11-02	Equipment failure	Modified 12 1/4" bit breaker.	SECURITY DBS	Other Drilling/Downhole Equipment	DRILLSTRING/DOWNHOLE EQUIPMENT	DIRECTIONAL DRILLING
	5.		10.5	1998-11-07	Equipment failure	Circulated and conditioned mud.	ANADRILL	Drillstring Motor	DRILLSTRING/DOWNHOLE EQUIPMENT	DIRECTIONAL DRILLING
	6.		7.5	1998-11-08	Equipment failure	Made up bit and ran in hole with bottom hole assembly.	ANADRILL	Drillstring Motor	DRILLSTRING/DOWNHOLE EQUIPMENT	DIRECTIONAL DRILLING
	7.		6.5	1998-11-09	Other	Made up hang off tool. Ran in hole and hung drillstring in wellhead.	NORSK HYDRO A/S			
	8.		5.0	1998-11-09	Waiting on weathe	Waited on weather.				
	9.		1.5	1998-11-09	Other	Ran back in and hung off drillstring in wellhea Pulled out with landing string.	SMEDVIG DRILLING A/S			
	10.		33.0	1998-11-10	Equipment failure	Waited for re-establishment of anchor # 12.	SMEDVIG DRILLING A/S	Anchor System	MATERIAL HANDLING SYSTEM	DRILLING CONTRACTOR
	7.	1	2.0	1998-11-11	Other	Ran in hole and retrieved hung off drillstring.	NORSK HYDRO A/S			
	11.		0.5	1998-11-15	Equipment failure	Repair/service 5" drillpipe elevator.	SMEDVIG DRILLING A/S	Elevator	PIPE HANDLING EQUIPMENT/SYSTEM	DRILLING CONTRACTOR
	12.		9.0	1998-11-16	Equipment failure	Pulled out of hole to 30 m due to CDN failure	ANADRILL	MWD/LWD	DRILLSTRING/DOWNHOLE EQUIPMENT	MWD/LWD
	13.		0.5	1998-11-16	Equipment failure	Disconnected torque wrench from top drive.	SMEDVIG DRILLING A/S	Elevator	PIPE HANDLING EQUIPMENT/SYSTEM	DRILLING CONTRACTOR
	14.		7.0	1998-11-19	Other	Ran in hole with suite # 2 FMI to log open ho section. Logging tools were not able to pass restriction.	SCHLUMBERGER NORGE A/S			
	15.		1.5	1998-11-19	Equipment failure	Trouble shooted on suite # 3 MDT tool and connectors. Found failure in power cartridge.	SCHLUMBERGER NORGE A/S	Electric Logging Eq. in General	SERVICE EQUIPMENT/SYSTEMS	ELECTRIC LOGGING
	16.		42.0	1998-11-20	Other	Pulled out to 3128 m with suite # 3 MDT due loss of communication.	NORSK HYDRO A/S			
	17.		5.0	1998-11-21	Waiting on weathe	Waited on weather.				
	18.		0.5	1998-11-22	Equipment failure	Waited on Smedvig to fill in oil to the hydrauli power unit.	SMEDVIG DRILLING A/S	Other Drill Floor Eq./Syst.	DRILL FLOOR EQUIPMENT/SYSTEMS	RIG UTILITIES
	19.		1.0	1998-11-24	Equipment failure	Pulled out to 3170 m. Repaired oil leak on topdrive circulation pump.	SMEDVIG DRILLING A/S	Top Drive	HOISTING EQUIPMENT	RIG UTILITIES
	20.		1.0	1998-11-28	Equipment failure	Repaired pneumatic operated drill pipe slips.	SMEDVIG DRILLING A/S	Slips and Spider	PIPE HANDLING EQUIPMENT/SYSTEM	RIG UTILITIES
	21.		32.5	1998-11-28	Waiting on weathe	Waited on weather.				
	22.		1.0	1998-11-29	Equipment failure	Rig power supply blacked out. Generator power supply stopped.	SMEDVIG DRILLING A/S	Rig Power Supply	MISCELLANEOUS EQUIPMENT/SYSTEM/SERVICES	DRILLING CONTRACTOR
	23.		3.5	1998-12-01	Equipment failure	Changed out damaged trolly feeding motor o catwalk	SMEDVIG DRILLING A/S	Vertical Pipe Handling	PIPE HANDLING EQUIPMENT/SYSTEM	PRODUCTION TESTING
	24.		0.5	1998-12-01	Equipment failure	Replaced leaking hydraulic hose on new troll feeding motor	SMEDVIG DRILLING A/S	Vertical Pipe Handling	PIPE HANDLING EQUIPMENT/SYSTEM	PRODUCTION TESTING
	25.		2.5	1998-12-03	Equipment failure	Actuator on STT leaking when trying to open flowline valve.	HALLIBURTON OILFIELD SERVICE	Other Well Control Related Equipment	WELLCONTROL EQUIPMENT/SYSTEM	PRODUCTION TESTING
		1	9.5	1998-12-03	Equipment failure	Chachange out damaged actuator cylinder.	HALLIBURTON OILFIELD SERVICE	Other Well Control Related Equipment	WELLCONTROL EQUIPMENT/SYSTEM	PRODUCTION TESTING
	26.		4.5	1998-12-04	Equipment failure	MWS prepare to make up new tool string.	MARITIME WELL SERVICE	Miscellaneous equipment, systems and servic	MISCELLANEOUS EQUIPMENT/SYSTEM/SERVICES	PRODUCTION TESTING
	27.		1.0	1998-12-07	Other	The SSTT valve was closed by accident. Opened the SSTT valve.	HALLIBURTON OILFIELD SERVICE			
	28.		1.5	1998-12-09	Equipment failure	Repaired bearing plate on wireline unit cable drum.	MARITIME WELL SERVICE	Electric Logging Eq. in General	SERVICE EQUIPMENT/SYSTEMS	ELECTRIC LOGGING

Downtime report, 30/9-19 A

Well	Rep	#	Hrs	Date	Downtime Type	Short Description	Responsible Contractor	Nsfi Type	Equipment Type	Service Type
30/9-19 A	29.		3.0	1998-12-11	Equipment failure	Repaired faulty isolation valve on Heave Compensator	SMEDVIG OFFSHORE A/S	Heave Compensator (Traveling Block Mounte	HOISTING EQUIPMENT	DRILLING CONTRACTOR
	30.		14.5	1998-12-15	Waiting on weathe	Waited on weather to pull BOP.				
	31.		1.5	1998-12-16	Equipment failure	ROV not able to locate BOP due to sonar/gyr failure.	STOLT COMEX SEAWAY	ROV	SERVICE EQUIPMENT/SYSTEMS	ROV
	32.		10.0	1998-12-17	Waiting on weathe	Waited on boat to start anchor handling.				
			251.5							

DAILY REPORT ON WELL 30/9-19 A

Daily report no : 1 **Date:** 1998-10-24
Midnight depth : 2834 m MD **Estimated PP:** 1.10 sg **Mud weight:** 1.31 sg

Stop time	Description
07:00	No activity on 30/9-19 A.
07:30	Made up cutting assembly and racked in derrick.
09:00	Made up and ran in hole with 8 1/2" mill to verify free space in wellhead due to lost lock ring. No restrictions. Pulled out of hole.
13:00	Made up casing cutter BHA and ran in hole to 2231 m.
14:30	Made up spear assembly and ran in hole to 2372 m.
15:30	Cut 9 5/8" casing at cutter depth 2372 m. Verified cut.
16:30	Attempted to pull 246 ton with spear, no success. Released spear and pulled out to 2231 m.
18:00	Slugged pipe and pulled out to 1030 m.
18:30	Lubricated rig and serviced topdrive.
19:30	Continued pulling out of hole.
21:00	Made up spear assembly with pack off and ran in hole.
21:30	Engaged spear and pulled 9 5/8" casing free with 32 ton overpull.
23:00	Pulled out of hole with casing and spear.
23:30	Attempted to release spear, no success.
23:59	Held safety meeting with crew prior to pull and lay down 9 5/8" casing.

Daily report no : 2 **Date:** 1998-10-25
Midnight depth : 2834 m MD **Estimated PP:** 1.10 sg **Mud weight:** 1.31 sg

Stop time	Description
02:00	Rigged up casing equipment prior to lay down 9 5/8" casing.
03:00	Managed to release spear. Found missing seal assembly lock ring wedged between hanger and spear. Laid down casing hanger.
07:30	Pulled out of hole with 9 5/8" casing and laid down on deck.
08:00	Installed diverter element to centralize casing while pulling out.
19:00	Continued pulling out of hole with 9 5/8" casing.
20:30	Rigged down all casing running equipment.
21:00	Ran in hole and jetwashed wellhead and BOP. Pulled out of hole.
23:00	Ran in hole and set wear bushing in wellhead. Pulled out of hole.
23:59	Made up 9 5/8" Para Bow tool on 3 1/2" cement stinger and ran in hole.

Daily report no : 3 **Date:** 1998-10-26
Midnight depth : 2268 m MD **Estimated PP:** 1.10 sg **Mud weight:** 1.31 sg

Stop time	Description
03:30	Continued run in hole with 9 5/8" Para Bow tool to 2470 m.
04:00	Circulated and rotated pipe to clean setting area for Para Bow.
05:00	Dropped ball # 1 and circulated to extrude and set Para Bow. Ballseat did not shear.
05:30	Dropped ball # 2 and circulated down. Set Para Bow at 2468 m.
07:00	Circulated and conditioned mud prior to pump cement slurry.
08:00	Made up cement stand. Pressure tested line to 150 bar.
09:30	Pumped and set a 14,8 m3 balanced cement slurry at 2464 m.
10:30	Racked cement stand and pulled out of cement slurry to 2177 m.
12:00	Circulated out excess cement.
12:30	Pulled out to 1919 m.
13:00	Pumped slug and serviced 5" elevator.
16:30	Continued pulling out of hole. Laid down Para Bow running tool.
17:00	Held safe job analysis prior to build scaffolding on rig floor.
21:30	Builded scaffolding at monkey board level in the derrick while wait on cement to set.
22:30	Prepared to change out drill-line drum.
23:59	Laid down all casing cutting equipment racked in the derrick.

Daily report no : 4 **Date:** 1998-10-27
Midnight depth : 2268 m MD **Estimated PP:** 1.10 sg **Mud weight:** 1.31 sg

Stop time	Description
01:30	Made up Halliburton cement head and racked back in derrick.

DAILY REPORT ON WELL 30/9-19 A

Daily report no : 4 **Date:** 1998-10-27
Midnight depth : 2268 m MD **Estimated PP:** 1.10 sg **Mud weight:** 1.31 sg

Stop time	Description
04:30	Made up 9 5/8" casing hanger with plugs, running tool and seal assembly. Racked same back in derrick.
08:30	Made up 12 1/4" kick-off assembly and racked back in derrick.
20:30	Changed drill line reel. Slipped new wire trough complete wire suspension system.
21:30	Laid down Red Baron annular swivel, cross-overs and pup joints.
23:59	Ran in hole with BHA from derrick and continued make up tools for BHA # 6.

Daily report no : 5 **Date:** 1998-10-28
Midnight depth : 2371 m MD **Estimated PP:** 1.10 sg **Mud weight:** 1.30 sg

Stop time	Description
01:00	Made up 12 1/4" BHA and ran in hole
04:00	Continued run in hole on drill pipe to 2177 m.
05:00	Circulated from 2177 m while running in hole, tagged kick-off plug at 2240 m.
06:00	Drilled cement inside 13 3/8 casing from 2240 m to 2274 m.
06:30	Circulated while changing screens on the shakers.
11:00	Continued drill cement from 2274 to 2346 m.
19:00	Commenced time drilled kick-off from 2346 m. No penetration below 2372 m.
20:30	Circulated bottoms up. Flowchecked well-static. Slugged pipe prior to pull out of hole.
23:30	Pulled out of hole to 230 m.
23:59	Continued pulling out of hole and racked BHA in derrick.

Daily report no : 6 **Date:** 1998-10-29
Midnight depth : 2268 m MD **Estimated PP:** 1.10 sg **Mud weight:** 1.30 sg

Stop time	Description
01:00	Pulled out of hole with 12 1/4" kick-off assembly.
02:00	Ran in hole with 3 1/2" cement stinger.
04:30	Continued run in hole on 5" drill pipe to 2317 m.
05:00	Made up cement stand with valves and side-entry sub.
06:00	Continued run in hole while circulating. Picked up cement stand and tagged cement at 2372 m.
06:30	Held pre-job meeting with crew.
07:00	Flushed lines and pressure tested surface lines to 150 bar.
08:00	Pumped and displaced a 10 m3 balanced cement slurry at 2372 m.
08:30	Pulled cement stinger out of plug to 2213 m.
09:00	Circulated out excess cement while working pipe.
11:30	Observed well-static. Slugged pipe and pulled out to 600 m.
12:00	Broke and laid down cement stand.
13:00	Continued pull out to below wellhead.
13:30	Washed wellhead and BOP area due to excess cement in return mud.
14:00	Continued pulling out of hole.
15:00	Made up BOP test plug. Ran in hole and installed same in wellhead.
19:00	Pressure tested BOP according to Norsk Hydro specifications.
20:00	Function tested BOP from mini-panel.
21:00	Pulled out of hole with test-string.
22:30	Rigged up and pressure tested topdrive-valves and hose.
23:59	Made up 12 1/4" kick-off BHA. Set bend-sub to 1,5 degrees.

Daily report no : 7 **Date:** 1998-10-30
Midnight depth : 2349 m MD **Estimated PP:** 1.10 sg **Mud weight:** 1.30 sg

Stop time	Description
02:00	Built 12 1/4" bottom hole assembly.
05:00	Ran in hole to 2213 m.
06:00	Continued running in hole while circulating. Tagged cement at 2273 m.
09:30	Drilled cement inside 13 3/8" casing from 2273 m to 2318 m, and 12 1/4" hole to 2323 m.
10:30	Circulated and conditioned mud prior to run Gyro-tool on wireline.
11:00	Held pre-job meeting and rigged up to run Gyro-tool.
13:00	Performed Gyro run on wireline. Oriented toolface.

DAILY REPORT ON WELL 30/9-19 A

Daily report no : 7 **Date:** 1998-10-30
Midnight depth : 2349 m MD **Estimated PP:** 1.10 sg **Mud weight:** 1.30 sg

Stop time	Description
23:00	Kicked off at 2323 m. Time-drilled 12 1/4" hole to 2345 m.
23:30	Continued drilling 12 1/4" hole to 2349 m. while increasing weight on bit and flow.
23:59	Performed Gyro run on wireline to orient toolface and compare readings with MWD surveys.

Daily report no : 8 **Date:** 1998-10-31
Midnight depth : 2428 m MD **Estimated PP:** 1.11 sg **Mud weight:** 1.30 sg

Stop time	Description
01:30	Performed gyro run on wireline.
02:00	Rigged down gyro . Took MWD survey and SCR.
08:30	Oriented and drilled 12 1/4" hole from 2349 m to 2400 m
09:30	Circulated bottoms up for gyro
11:30	Performed gyro run on wireline
23:00	Oriented and drilled 12 1/4" hole from 2400 m to 2428 m.
23:59	Pulled out of the hole to 2313 m. Flowchecked, pumped slug and continued pulling out of the hole to 2149 m.

Daily report no : 9 **Date:** 1998-11-01
Midnight depth : 2428 m MD **Estimated PP:** 1.11 sg **Mud weight:** 1.30 sg

Stop time	Description
00:30	Pulled out of the hole from 2149 m to 1940 m
23:59	Replaced the failed Elmagco brake bearing

Daily report no : 10 **Date:** 1998-11-02
Midnight depth : 2468 m MD **Estimated PP:** 1.11 sg **Mud weight:** 1.30 sg

Stop time	Description
02:00	Changed bearing on Elmagco brake.
04:30	Pulled out of hole from 1940m to 198m.
07:30	Removed diverter insert and racked the BHA in derrick.
09:00	Layed down the MWD and made up the CDR. Made up the MWD tool.
10:30	Modified 12 1/4" bit breaker.
12:00	Made up 12 1/4" bit, 11 7/8" stabiliser and NMDC. Ran in hole with the BHA.
14:00	Ran in hole with the 12 1/4" assembly to 2330m.
16:00	Reamed and logged with the MWD from 2330m to 2428m.
23:59	Drilled and oriented 12 1/4" hole from 2428m to 2468m.

Daily report no : 11 **Date:** 1998-11-03
Midnight depth : 2558 m MD **Estimated PP:** 1.11 sg **Mud weight:** 1.30 sg

Stop time	Description
06:00	Drilled and oriented 12 1/4" hole from 2468m to 2520m.
07:00	Circulated bottom up
08:00	Flow checked well and pulled out to 13 3/8" casing shoe.
10:30	Continued pulling out of hole to 203 m
12:30	Pulled out of hole with bottom hole assembly.
13:00	Lubricated and serviced top drive and hoisting equipment.
16:30	Made up bottom hole assembly.
17:00	Ran in hole to 1000 m. Broke circulation and tested MWD tool.
19:00	Continued running in hole to 13 3/8" casing shoe.
19:30	Continued running in hole to 2522 m.
20:00	Made up drilling pup and broke circulation.
23:59	Drilled and oriented 12 1/4" hole from 2522 m to 2558 m.

DAILY REPORT ON WELL 30/9-19 A

Daily report no : 12 **Date:** 1998-11-04
Midnight depth : 2752 m MD **Estimated PP:** 1.11 sg **Mud weight:** 1.30 sg

Stop time	Description
23:59	Continued drilling and orienting from 2558 m to 2752 m.

Daily report no : 13 **Date:** 1998-11-05
Midnight depth : 2867 m MD **Estimated PP:** 1.11 sg **Mud weight:** 1.30 sg

Stop time	Description
20:00	Continued drilling and orienting from 2752 m to 2855 m.
21:00	Swept hole with 10 m3 high - viscosity mud.
23:00	Continued drilling and orienting 12 1/4" hole to 2867 m.
23:59	Flow checked and pulled out of hole to 2606 m.

Daily report no : 14 **Date:** 1998-11-06
Midnight depth : 2960 m MD **Estimated PP:** 1.11 sg **Mud weight:** 1.30 sg

Stop time	Description
00:30	Continued pulling out of hole to 13 3/8" casing shoe.
03:00	Continued pulling out of hole to 205 m.
04:30	Pulled out bottom hole assembly. Changed bit.
06:00	Downloaded CDR memory bank and rearranged bottom hole assembly.
07:30	Ran in hole wih bottom hole assembly.
08:30	Ran in hole to 1003 m. Broke circulation.
10:00	Continued in hole to 13 3/8" casing shoe.
11:00	Continued running in hole to 2836 m.
12:30	Reamed and logged hole with MWD from 2836 m to 2867 m.
19:00	Drilled and oriented 12 1/4" hole from 2867 m to 2925 m.
20:00	Lubricated top drive and hoisting equipment. Changed wash pipe.
23:59	Continued drilling and orienting 12 1/4" hole from 2925 m to 2960 m.

Daily report no : 15 **Date:** 1998-11-07
Midnight depth : 3075 m MD **Estimated PP:** 1.11 sg **Mud weight:** 1.30 sg

Stop time	Description
13:30	Drilled 12 1/4" hole from 2960 m to 3075 m.
15:00	Circulated and conditioned mud.
17:30	Pulled out of hole to 13 3/8" casing shoe.
21:00	Continued pulling out of hole to 205 m.
23:30	Pulled bottom hole assembly. Downloaded CDR memory bank. Laid out bit and mud motor.
23:59	Picked up new mud motor.

Daily report no : 16 **Date:** 1998-11-08
Midnight depth : 3159 m MD **Estimated PP:** 1.13 sg **Mud weight:** 1.30 sg

Stop time	Description
02:30	Made up bit and ran in hole with bottom hole assembly.
04:30	Continued in hole with 5" drillpipe to 2318 m.
05:30	Slipped and cut 34 m off drilling line. Serviced top drive and hoisting equipment.
07:00	Continued running in hole to 3036 m.
08:30	Reamed down from 3036 m to 3075 m.
23:59	Drilled and oriented 12 1/4" hole from 3075 m to 3159 m.

Daily report no : 17 **Date:** 1998-11-09
Midnight depth : 3197 m MD **Estimated PP:** 1.13 sg **Mud weight:** 1.30 sg

Stop time	Description
04:30	Continued drilling 12 1/4" hole from 3159 m to 3197 m.
06:00	Circulated bottom up for samples. Swept hole with 10 m3 high viscosity mud.

DAILY REPORT ON WELL 30/9-19 A

Daily report no : 17 **Date:** 1998-11-09
Midnight depth : 3197 m MD **Estimated PP:** 1.13 sg **Mud weight:** 1.30 sg

Stop time	Description
09:00	Flow checked well and pulled out to 13 3/8" casing shoe.
11:00	Continued pulling out of hole to 1202 m.
14:30	Made up hang off tool. Ran in hole and hung off drillstring in wellhead. Displaced riser to seawater. Pulled out of hole with landing string.
19:30	Waited on weather.
22:30	Ran in hole and retrieved drillstring. Displaced riser back to 1,30 sg mud.
23:59	Ran back in and hung off drillstring in wellhead. Pulled out with landing string.

Daily report no : 18 **Date:** 1998-11-10
Midnight depth : 3197 m MD **Estimated PP:** 1.13 sg **Mud weight:** 1.30 sg

Stop time	Description
23:59	Waited for re-establishment of anchor # 12. Retrieved anchor cable with assistance from Maersk Promoter. Anchor chain was parted in 5th link from swivel. M. Promoter recovered remaining chain and anchor. Departed for Mongstad at 2140 hrs.

Daily report no : 19 **Date:** 1998-11-11
Midnight depth : 3197 m MD **Estimated PP:** 1.13 sg **Mud weight:** 1.30 sg

Stop time	Description
09:00	Waited for re-establishment of anchor #12.
11:00	Ran in hole and retrieved hung off drillstring.
13:00	Ran in hole to 2318 m.
14:00	Continued running in hole to 3122 m.
14:30	Washed down to 3197 m.
17:30	Swept hole with 10 m3 high viscosity mud and cirulated until hole was clean.
19:00	Flow checked and pulled out of hole to 13 3/8" casing shoe.
21:30	Continued pulling out of hole to 204 m.
23:00	Pulled out with bottom hole assembly.
23:59	Ran in hole with jet sub and wear bushing retrieving tool. Washed BOP and wellhead.

Daily report no : 20 **Date:** 1998-11-12
Midnight depth : 3197 m MD **Estimated PP:** 1.13 sg **Mud weight:** 1.30 sg

Stop time	Description
01:00	Continued washing of wellhead and BOP. Retrieved wear bushing.
03:00	Rigged up to run 9 5/8" casing.
21:30	Ran 9 5/8" casing to 2318 m.
23:59	Continued running 9 5/8" casing to 2845 m.

Daily report no : 21 **Date:** 1998-11-13
Midnight depth : 3197 m MD **Estimated PP:** 1.13 sg **Mud weight:** 1.30 sg

Stop time	Description
02:00	Continued running 9 5/8" casing from 2845 m - 3060 m.
04:30	Made up casing hanger. Rigged down casing handling equipment. Ran in hole with landing string and landed casing at 3187 m.
05:30	Circulated annulus volume.
08:00	Flushed and tested surface lines. Pumped spacer and cement as per program. Displaced cement with 1,3 sg mud. Bumped and tested wiper plug.
09:00	Rigged down surface lines and casing modem.
09:30	Sat and tested seal assembly.
14:30	Tested BOP on blue pod. Functiontested on yellow. Functioned upper pipe ram on accoustic system.
15:30	Released casing hanger running tool and pulled out of hole.
17:30	Ran in hole and sat 9 5/8" wear bushing. Pulled out of hole with running tool.
18:00	Changed bails for top drive.
20:30	Laid down 12 1/4" bottom hole assembly from derrick.
22:30	Tested surface equipment.

DAILY REPORT ON WELL 30/9-19 A

Daily report no : 21 **Date:** 1998-11-13
Midnight depth : 3197 m MD **Estimated PP:** 1.13 sg **Mud weight:** 1.30 sg

Stop time	Description
23:59	Commenced building 8 1/2" bottom hole assembly.

Daily report no : 22 **Date:** 1998-11-14
Midnight depth : 3300 m MD **Estimated PP:** 1.13 sg **Mud weight:** 1.30 sg

Stop time	Description
01:00	Continued building 8 1/2" bottom hole assembly.
04:30	Ran in hole and tagged top of cement with 10 ton at 3137 m.
05:00	Held choke drill with crew.
08:30	Drilled cement, wiper plugs, float collar and shoe at 3187 m. Cleaned out rat hole and drilled 3 m of new formation to 3200 m.
10:00	Swept hole with 10 m3 high viscosity mud. Condition mud.
10:30	Pulled back into 9 5/8" casing shoe and performed leak off test.
13:00	Ran back to bottom and pumped 15 m3 high viscosity spacer prior to displacing hole to new sulphate free 1,30 sg Glydrill mud.
15:30	Drilled 8 1/2" hole from 3200 m to 3256 m.
18:00	Circulated bottoms up for samples.
19:30	Continued drilling from 3256 m to 3284 m.
20:30	Circulated bottoms up for samples.
22:00	Continued drilling from 3284 m to 3300 m.
23:30	Circulated bottoms up for samples.
23:59	Pulled out of hole to 3261 m.

Daily report no : 23 **Date:** 1998-11-15
Midnight depth : 3342 m MD **Estimated PP:** 1.13 sg **Mud weight:** 1.30 sg

Stop time	Description
00:30	Continued pulling out of hole to 9 5/8" casing shoe.
04:00	Continued pulling out of hole to 230 m.
05:00	Pulled out of hole with bottom hole assembly.
08:30	Made up core barrel assembly.
09:00	Ran in hole with bottom hole assembly.
11:30	Continued running in the hole to 3250 m.
12:00	Washed down from 3250 m to 3300 m.
14:00	Circulated bottom up.
15:00	Spaced out string. Dropped ball. Took slow pumprate.
16:00	Cut core from 3300 m to 3342 m.
17:00	Flow checked well and pulled back into 9 5/8" casing shoe.
20:00	Pulled out of hole to 928 m.
20:30	Repair/service 5" drillpipe elevator.
23:00	Continued pulling out of hole to 57 m.
23:30	Held safety meeting with SJA prior to laying out inner core barrel.
23:59	Started laying down inner core barrel.

Daily report no : 24 **Date:** 1998-11-16
Midnight depth : 3342 m MD **Estimated PP:** 1.13 sg **Mud weight:** 1.30 sg

Stop time	Description
01:00	Continued laying down inner core barrel.
02:30	Service broke and laid down outer core barrel.
03:30	Broke and laid down cement head from derrick.
05:00	Built new 8 1/2" bottom hole assembly.
06:00	Changed MWD tool. Initialised new tool.
08:00	Continued running in hole with bottom hole assembly.
08:30	Serviced hoisting equipment.
09:00	Continued running in hole to 573 m.
09:30	Attempted to test MWD package.
11:00	Pulled out of hole to 30 m.

DAILY REPORT ON WELL 30/9-19 A

Daily report no : 24 **Date:** 1998-11-16
Midnight depth : 3342 m MD **Estimated PP:** 1.13 sg **Mud weight:** 1.30 sg

Stop time	Description
14:30	Downloaded data from MWD. Attempted repairs on CDN tool.
16:00	Replaced primary CDN tool with back up tool.
17:00	Laid out back up CDN tool. Rearranged bottom hole assembly.
17:30	Ran in hole to 90 m and tested MWD tool.
18:30	Continued running in hole to 573 m.
21:30	Ran in hole to 9 5/8" casing shoe at 3187 m.
22:00	Continued running in hole to 3285 m.
22:30	Disconnected torque wrench from top drive.
23:00	Washed, reamed and worked tight hole from 3285 m to 3295 m.
23:59	Reamed and MWD logged from 3295 m to 3314 m.

Daily report no : 25 **Date:** 1998-11-17
Midnight depth : 3743 m MD **Estimated PP:** 1.19 sg **Mud weight:** 1.30 sg

Stop time	Description
01:00	Continued reaming of previously cored hole to obtain MWD logs.
23:59	Drilled 8 1/2" hole from 3342 m to 3743 m.

Daily report no : 26 **Date:** 1998-11-18
Midnight depth : 3775 m MD **Estimated PP:** 1.19 sg **Mud weight:** 1.30 sg

Stop time	Description
02:30	Continued drilling 8 1/2" hole from 3743 m to 3775 m.
04:30	Swept hole with 10 m3 weighted high viscosity mud and circulated until hole was clean.
07:00	Pulled out of hole to 9 5/8" casing shoe.
08:00	Slipped and cut 34 m off drilling line.
08:30	Serviced top drive and hoisting equipment.
10:00	Ran in hole to 3775 m.
11:30	Swept hole with 10 m3 weighted high viscosity mud and circulated to clean hole.
13:00	Pulled out of hole to find wash out in drillpipe.
15:30	Continued pulling out of hole to 1194 m.. Found wash out in 5" drillpipe
16:30	Circulated at 1194 m to pump previously pumped high viscosity mud out of hole.
17:30	Pulled out of hole to 223 m.
19:30	Pulled out of hole and racked BHA in derrick.
21:00	Rigged up to run wireline logs.
22:30	Picked up logging tools for suite # 1: PEX.
23:59	Ran in hole with suite # 1 PEX. Logged open hole section.

Daily report no : 27 **Date:** 1998-11-19
Midnight depth : 3775 m MD **Estimated PP:** 1.23 sg **Mud weight:** 1.30 sg

Stop time	Description
06:30	Continued logging open hole section and pulled out of hole with suite # 1 PEX.
08:30	Laid down tools for suite # 1 PEX. Made up tools for suite # 2 FMI.
12:00	Ran in hole with suite # 2 FMI to log open hole section. Logging tools were not able to pass restriction at 3280 m. Pulled out of hole.
15:30	Laid down tools for suite # 2 FMI. Made up suite # 3 with MDT log.
19:00	Ran in hole with suite # 3 MDT. Not able to pass restriction at 3204 m. Pulled out of hole.
20:30	Trouble shooted on suite # 3 MDT tool and connectors. Found failure in power cartridge for logging tools. Changed out with spear power cartrigdge.
23:00	Rigged up to run suite # 3 MDT on 5" drill pipe.
23:59	Ran in hole with suite # 3 MDT on 5" drill pipe.

DAILY REPORT ON WELL 30/9-19 A

Daily report no : 28 **Date:** 1998-11-20
Midnight depth : 3775 m MD **Estimated PP:** 1.23 sg **Mud weight:** 1.30 sg

Stop time	Description
05:30	Continued running in hole with suite # 3 on 5" drill pipe to 3128 m.
07:30	Rigged up and installed cable sidedoor entry sub.
10:00	Ran in with wireline locomotive inside drill pipe to connect to docking head
13:00	Ran in hole and logged with Mutual Formation Dynamic Tester.
14:30	Pulled out to 3128 m with suite # 3 MDT due to loss of communication with logging tools.
19:30	Broke cable side entry sub. Unlatched wet connector and pulled out with locomotive to cut of damaged cable.
23:59	Slipped and cut 3000 m wire from drum. Made new rope-socket connection to locomotive.

Daily report no : 29 **Date:** 1998-11-21
Midnight depth : 3775 m MD **Estimated PP:** 1.23 sg **Mud weight:** 1.30 sg

Stop time	Description
00:30	Rigged up and installed cable sidedoor entry sub.
04:00	Ran in with wireline locomotive inside drill pipe to connect to docking head.
05:30	Ran in hole and logged with Mutual Formation Dynamic Tester.
07:00	Pulled out to 3128 m with suite # 3 due to loss of communication with logging tool.
12:00	Broke cable sidedoor entry sub. Unlatched wet connector and pulled out with locomotive to cut of damaged cable. Cut damaged cable and reterminated and installed torpedo connection.
14:30	Installed cable sidedoor entry sub and ran down inside drill pipe with locomotive to connect to docking head.
19:30	Waited on weather.
20:30	Ran in hole with suite # 3 MDT to 3343 m.
23:59	Logged with Mutual Formation Dynamic Tester.

Daily report no : 30 **Date:** 1998-11-22
Midnight depth : 3775 m MD **Estimated PP:** 1.23 sg **Mud weight:** 1.30 sg

Stop time	Description
04:00	Continued logging with Mutual Formation Dynamic Tester.
04:30	Trouble shooted wireline unit due to loss of 50 volt currant supply and loss of communication with logging tools.
06:00	Pulled inside casing shoe with suite # 3 MDT, due to loss of communication with logging tool.
12:30	Inspected cable at surface and found one spot of squeezed cable. Slipped and cut 300 m cabel and reterminated torpedo connection.
14:30	Ran in hole with suite # 3 MDT to 3455 m.
19:30	Logged with Mutual Formation Dynamic Tester to 3468 m.
21:00	Pulled inside casing shoe with suite # 3 MDT, due to loss of communication with logging tool.
23:30	Inspected cable at surface and did not find any spots of squeezed cable. Dismounted torpedo connection. Slipped and cut 400 m of cable and reterminated cable and torpedo connection.
23:59	Waited on Smedvig to fill oil on the hydraulic power unit.

Daily report no : 31 **Date:** 1998-11-23
Midnight depth : 3775 m MD **Estimated PP:** 1.23 sg **Mud weight:** 1.30 sg

Stop time	Description
02:30	Ran in hole with suite # 3 MDT to 3462 m.
06:30	Logged with Mutual Formation Dynamic Tester.
07:30	Pulled out with suite # 3 MDT to 3381 m.
13:00	Logged with Mutual Formation Dynamic Tester.
13:30	Pulled out with suite # 3 MDT to 3373 m.
17:30	Logged with Mutual Formation Dynamic Tester.
18:30	Pulled inside casing shoe with suite # 3 MDT.
21:30	Unlatched wet connector and pulled out with logging cable inside drill pipe.
23:59	Pulled out of hole with suite # 3 MDT to 1300 m.

Daily report no : 32 **Date:** 1998-11-24
Midnight depth : 3775 m MD **Estimated PP:** 1.23 sg **Mud weight:** 1.30 sg

Stop time	Description
02:00	Continued pulling out of hole with suite # 3 MDT on 5" drill pipe.

DAILY REPORT ON WELL 30/9-19 A

Daily report no : 32 **Date:** 1998-11-24
Midnight depth : 3775 m MD **Estimated PP:** 1.23 sg **Mud weight:** 1.30 sg

Stop time	Description
03:30	Pulled out and laid down suite # 3 MDT logs.
04:00	Made up 8 1/2" bit and ran in hole with bottom hole assembly.
09:00	Continued run in hole with 5" drill pipe.
09:30	Broke circulation at 3170 m.
11:30	Continued run in hole to 3315 m. Washed and reamed tight spots from 3270 m to 3300 m. Worked tight spot at 3315 m.
12:30	Pulled out to 3170 m. Repaired oil leak on topdrive circulation pump. Ran in hole to 3315 m.
21:00	Washed and reamed to 3775 m.
23:30	Swept hole with 10 m3 weighted high viscosity mud and circulated until hole was clean.
23:59	Flowchecked well and pulled out of hole.

Daily report no : 33 **Date:** 1998-11-25
Midnight depth : 3775 m MD **Estimated PP:** 1.23 sg **Mud weight:** 1.30 sg

Stop time	Description
05:30	Continued pulling out of hole and racked bottom hole assembly in derrick.
06:00	Serviced hoisting equipment.
08:00	Made up cement head on 5 " drill pipe and racked back in derrick.
10:00	Rigged up wireline equipment and prepared to run suite # 4 FMI, DSI, CMR.
13:30	Ran in hole with suite # 4 FMI, DSI, CMR. Not able to pass 3202 m. Pulled out of hole.
14:00	Laid down CMR, FMI and function tested suite # 5 DSI.
19:00	Ran in hole with suite # 5 DSI. Logged open hole section and pulled out of hole.
19:30	Laid down suite # 5 DSI and made up suite # 6 CMR.
23:59	Ran in hole with suite # 6 CMR. Logged open hole section between 3275 m and 3460 m.

Daily report no : 34 **Date:** 1998-11-26
Midnight depth : 3775 m MD **Estimated PP:** 1.23 sg **Mud weight:** 1.30 sg

Stop time	Description
04:00	Continued logging with suite # 6 CMR and pulled out of hole.
04:30	Rigged down wireline running equipment.
07:30	Rigged up to run 7" liner.
12:30	Ran in hole with 7" liner to 737 m.
13:30	Made up liner hanger. Circulated 15 m3 with mud to check liner hanger.
14:30	Laid down liner running equipment.
18:00	Ran in hole with 7" liner on 5" drill pipe to 9 5/8" casing shoe. Took up and down weights.
20:00	Continued run in hole with 7" liner on 5" drill pipe. Broke circulation and tagged bottom at 3770 m.
20:30	Made up cement head and connected circulating lines.
21:30	Broke circulation and circulated 50 m3 while rotating and reciprocating string. Managed to wash down to 3772 m.
22:00	Dropped liner hanger setting ball and circulated down. Set hanger.
23:00	Circulated bottoms up while rotating string.
23:59	Pressure tested surface line to 220 bar. Pumped spacer, dropped lower dart. Mixed and pumped 15,5 m3 1,90sg cement slurry.

Daily report no : 35 **Date:** 1998-11-27
Midnight depth : 3775 m MD **Estimated PP:** 1.23 sg **Mud weight:** 1.30 sg

Stop time	Description
00:30	Continued mix and pump 15,5 m3 - 1,90sg cement slurry. Dropped upper dart and pumped spacer behind cement.
01:30	Displaced cement with 40,4 m3 mud. Overdisplaced with 1/2 shoe track volume. Did not bump plug in landing collar. Checked for backflow.
02:00	Pulled hanger running tool setting sleeves above PBR and activated liner hanger packer.
02:30	Pressure tested liner hanger packer and 9 5/8" annulus to 200 bar.
03:00	Pulled liner hanger running tool above 7" liner PBR.
03:30	Reverse circulated 42 m3 mud. Dumped excess cement and spacer.
04:00	Circulated 56 m3 mud long way to clean pipe.
10:00	Flowchecked well, slugged pipe and pulled out of hole to with liner running tool.
11:00	Laid down cement head and hang off from derrick.
13:00	Laid down bottom hole assembly from derrick.

DAILY REPORT ON WELL 30/9-19 A

Daily report no : 35 **Date:** 1998-11-27
Midnight depth : 3775 m MD **Estimated PP:** 1.23 sg **Mud weight:** 1.30 sg

Stop time	Description
16:00	Made up liner clean out assembly with 6,059" mill, 7" casing scrapers and ran in hole on 3,5" drill pipe to 413 m.
19:30	Made up 7" PBR milling assembly and continued run in hole on 5" drill pipe to 3328 m.
20:00	Dressed 7" PBR with milling assembly and confirmed top PBR at 3032 m.
21:30	Circulated and conditioned mud to optimise mud parameters prior to run test string.
23:00	Flowchecked well and pulled out of hole to 2100 m.
23:59	Slipped and cut 34 m of drilling line.

Daily report no : 36 **Date:** 1998-11-28
Midnight depth : 3775 m MD **Estimated PP:** 1.23 sg **Mud weight:** 1.30 sg

Stop time	Description
01:00	Repaired pneumatic operated drill pipe slips.
04:00	Continued pulling out of hole. Laid down 6,059 mill, 7" casing scrapers and PBR mill assembly.
05:00	Made up and ran in hole with BOP test tool.
09:30	Tested BOP on blue pod. Function tested on yellow pod. Function tested BOP accoustic system.
10:00	Pulled out of hole with BOP test tool.
13:00	Rigged up wireline equipment prior to run CBL logsuite.
19:00	Ran in hole and logged with CBL logsuite from 3016 m to 3410 m. Pulled out of hole.
19:30	Laid down CBL logsuite.
20:30	Prepared to run 7" EZSV on wireline.
23:00	Ran in hole with 7" EZSV on wireline. Set plug at 3405 m and pulled out of hole.
23:30	Rigged down wireline equipment.
23:59	Waited on weather.

Daily report no : 37 **Date:** 1998-11-29
Midnight depth : 3775 m MD **Estimated PP:** 1.23 sg **Mud weight:** 1.30 sg

Stop time	Description
20:30	Continued wait on belated supply boat due to weather.
21:30	Rig main power supply blacked out. Generator power supply stopped due to faulty fuel pump.
23:59	Prepared Tubing Conveyed Perforation guns after receiving tools from supply boat.

Daily report no : 38 **Date:** 1998-11-30
Midnight depth : 3775 m MD **Estimated PP:** 1.23 sg **Mud weight:** 1.30 sg

Stop time	Description
09:00	Continued check and prepare Tubing Conveyed Perforation guns prior to make up bottom hole assembly.
09:30	Held pre job meeting with crew prior to run in hole with test string.
14:30	Made up and ran in hole with Tubing Conveyed Perforation guns.
18:00	Continued run in hole with bottom hole assembly to 285 m.
19:30	Pressure tested bottom hole assembly to 500 bar/10 min.
21:00	Continued make up and run in hole with 3 1/2" PH6 tubing to 420 m.
22:30	Made up crossover to 5" Hydril tubing and changed to 5" running equipment.
23:59	Continued make up and run in hole with 5" Hydril tubing to 553 m.

Daily report no : 39 **Date:** 1998-12-01
Midnight depth : 3775 m MD **Estimated PP:** 1.23 sg **Mud weight:** 1.30 sg

Stop time	Description
10:00	Make up and continue run in hole with 5" Hydril tubing from 653 to 1740 m
13:30	Changed out damaged trolly feeding motor on catwalk
14:30	Continued runing in hole with 5" Hydril tubing from 1740 m to 1800 m
15:00	Replaced leaking hydraulic hose on new trolly feeding motor
23:59	Continued runing in hole with 5" Hydril tubing from 1800 m to 2903 m

DAILY REPORT ON WELL 30/9-19 A

Daily report no : 40 **Date:** 1998-12-02

Midnight depth : 3775 m MD **Estimated PP:** 1.23 sg **Mud weight:** 1.30 sg

Stop time	Description
03:30	Running in hole with 5" tubing from 2903 m to 3233 m.
05:30	Made up the dummy hanger and laid down the diverter element.
06:00	Run in with 4 stands drillpipe for dummy run.
07:00	Change to long bails and rig up MWS wireline equipment.
07:30	Space out and land the dummy hanger in wellhead.
12:00	Made correlation run with MWS. In at 08:00 hrs out at 11:55 hrs.
13:00	Lay down the MWS wirwline tools and logging sub. Change bails
14:30	Pull out with 4 stands 5" drill pipe. Lay down the dummy hanger and re-arrange the tubing pup joints to place guns on depth.
17:00	Place umbilicals and SSTT control panel on rig floor. Pick up the SSTT and connect the control lines. Function test SSTT unlatch/latch. Fill the test string with diesel.
18:00	Pressure test surface lines to 500 bar. Pressure test string against LPR-N valve to 500 bar.
19:00	Pressure test control lines and inflow test. Rig down test lines.
21:00	Run in with the 5 " tubing landing string to 3338 m.
22:30	Pick up the 2 SSLV's and make up to test string.
23:59	Change to long bails and rig up MWS wire line equipment.

Daily report no : 41 **Date:** 1998-12-03

Midnight depth : 3775 m MD **Estimated PP:** 1.23 sg **Mud weight:** 1.30 sg

Stop time	Description
04:00	Pressure test upper and lower lubricator valves to 500 bar from below. Pressure test chemical injection lines to 500 bar. Rig down pressure test equipment.
04:30	Install coflex hoses on STT.
09:00	Pick up STT and make up the coflex hoses to the standpipe.
13:00	Rig up MWS wireline equipment. Install X-O sub, BOP and lubricator.
14:30	Flush surface lines and STT with diesel. Connect control lines to STT. Land hanger in wellhead at 14:25 hrs.
17:00	Pressure test kill hose to 500 bar. When attempt to open flowline valve on STT, actuator started leaking. Open/close valve several times using high volume pump.
20:00	Land hanger in well head, pressure test against choke manifold to 500 bar and operated PSD1. Pressure test flowline and safety valve against choke manifold to 500 bar. Pressure tested both lubricators to 500 bar. Master valve to 500 bar.
23:59	Pick up test string 4 m to 3366 m. Held SJA meeting. Changed out damaged actuator cylinder on STT flowline valve.

Daily report no : 42 **Date:** 1998-12-04

Midnight depth : 3775 m MD **Estimated PP:** 1.23 sg **Mud weight:** 1.30 sg

Stop time	Description
05:00	Continued to change actuator cylinder in STT flow line valve.
05:30	Function/pressure test production valve on STT to 500 bar from below.
07:30	Set the packer at 3329 m.
08:00	Line up control hoses, secure kill/flow hoses.
09:00	MWS prepare to make up new tool string.
10:30	Trubleshot and repaired toolcatcher in lubricator.
11:30	Install new toolstring in lubricator.
12:00	Held safety meeting with crews prior to perforate.
13:00	Attempt to pressure test wireline lubricator and stuffing box against master valve.
13:30	Pressure test lubricator and stuffing box to 500 bar.
14:30	Pressure up annulus to 110 bar to open LPR-N valve. Pressure up the test string to 480 bar and perforated the well from 3348 m to 3364 m
23:00	Well opened on 20/64" adjustable choke for clean up. 14:44 hrs: increased to 32/64" 16:55 hrs into test separator. 17:10 hrs 48/64" 18:30 hrs 64/64" 19:00 80/64". All adjustables. Shut in well at LPR-N and choke manifold at 22:50 hrs.
23:59	Well shut in for clean-up build-up.

Daily report no : 43 **Date:** 1998-12-05

Midnight depth : 3775 m MD **Estimated PP:** 1.23 sg **Mud weight:** 1.30 sg

Stop time	Description
10:30	Well shut in for clean-up build-up.
23:59	Pressure up annulus to 120 bar to open LPR-N. Opened well for main flow on 32/64" fixed choke. At 16:45 hrs changed to 48/64" adjustable choke. At 22:45 hrs change to 64/64" fixed choke.

DAILY REPORT ON WELL 30/9-19 A

Daily report no : 44 **Date:** 1998-12-06
Midnight depth : 3775 m MD **Estimated PP:** 1.23 sg **Mud weight:** 1.30 sg

Stop time	Description
11:00	Continued main flow period on 64/64" choke. Shut in well at Halliburton choke manifold at 11:00 hrs
23:00	Well shut in at choke manifold for surface main build up.
23:59	Close LSSLV and inflow test to 192 bar. Close USSLV. Rig down SRO tools from lubricator. Pick up and install MWS sampling tools in lubricator.

Daily report no : 45 **Date:** 1998-12-07
Midnight depth : 3775 m MD **Estimated PP:** 1.23 sg **Mud weight:** 1.30 sg

Stop time	Description
07:00	Installed the MWS downhole sampling tools in the lubricator. Pressure tested the libricator to 260 bar. Equalized the tubing pressure to 212 bar and opened the LSSLV. Ran in with samplers at 0420 hrs. Set the bottom of BHS at 3360 m.
10:00	At 0747 opened the well on 12/64" choke to the separator. At 0757 increased the choke to 32/64" adjustable.
15:30	At 1005 changed to 8/64" fixed choke for sampling. Picked up the tools to 3343 m. Fired and filled samplers. Closed the samplers and pulled the tools above the tester valve. Closed the LPR-N for downhole build-up. Pulled out with samplers.
17:30	Closed and inflow tested the LSSLV. Closed the USSLV. Rigged down the wireline tool string. Bled the test string to 0 bar at the choke manifold.
20:00	Pumped 21 m3 1.30 sg mud into the test string. Opened the LPPRN valve. Bullheaded with 5.35 m3 mud. total mud pumped 26.35 m3. Performed minifrac flow check.
21:00	Opened the RD circulating valve with 247 bar annulus pressure. Reverse circulated.
22:00	The SSTT valve was closed by accident. Opened the SSTT valve.
22:30	Reverse circulated to 4.5 % gas after the poor-boy degasser.
23:00	Opened the MPR. Unseated the RTTS packer and landed the fluted hanger in the wellhead. Closed the MPR.
23:30	Bulleheaded the fluid below the packer to formation with 4 m3 1.30 sg mud.
23:59	Reverse circulated up the kill line into the poor-boy degasser.

Daily report no : 46 **Date:** 1998-12-08
Midnight depth : 3775 m MD **Estimated PP:** 1.23 sg **Mud weight:** 1.30 sg

Stop time	Description
06:30	Reverse circulated. Maximum gas 11.9 % after po-boy degasser.
07:30	Flushed surface lines with seawater.
11:00	Rigged down surface test equipment and Coflexip hoses. Laid out the SST.
13:30	Laid down LSSLV, USSLV, 5" tubing landing string and SSTT
14:00	Cleared and cleaned the rig floor
23:59	Pulled out with the test string and laid down 5" tubing from 3230 m to 1616 m.

Daily report no : 47 **Date:** 1998-12-09
Midnight depth : 3775 m MD **Estimated PP:** 1.23 sg **Mud weight:** 1.30 sg

Stop time	Description
07:00	Continued pulling out of the hole with the test string and laid down test string from 1616 m to 419 m.
08:00	Changed from 5" to 3 1/2" handling equipment
10:30	Laid down test string BHA to 4 3/4" drill collars.
11:00	Laid down iron roughneck tubing modem.
14:30	Continued lay down 4 3/4" drill collars and BHA.
15:00	Cleared equipment/test tools from rig floor.
16:00	Rigged up the MWS wireline equipment with 7" bridge plug.
19:00	Ran in hole with the bridge plug on wireline. Set the plug at 3333 m. Pulled out with the setting tool to 3130 m.
20:30	Repaired bearing plate on wireline unit cable drum.
21:30	Continued pulling out with the wireline setting tool.
22:00	Rigged down the wireline equipment.
22:30	Made up 5" drill pipe stand with pump-sub, kelly cock, lo-torque valve and cement hose. Racked back in derrick.
23:00	Lubricated the rig
23:59	Made up the diverter sub on 3 1/2" drill pipe and ran in the hole to 142 m.

DAILY REPORT ON WELL 30/9-19 A

Daily report no : 48 **Date:** 1998-12-10
Midnight depth : 3775 m MD **Estimated PP:** 1.23 sg **Mud weight:** 1.30 sg

Stop time	Description
01:00	Contiuned running in with the 3 1/2" to 318 m..
04:30	Ran in with 5" drill pipe to 3324 m.
06:00	Tagged the bridge plug at 3333 m. Circulated and conditioned the mud to 1.30 sg
07:30	Set a balanced cement plug from 3333 m to 3133 m.
08:00	Pulled out with the cement string from 3333 m to 3133 m.
09:00	Reverse circulated at 3133 m.
10:00	Pressure tested surface cement line to 150 bar. Set a balanced cement plug from 3133 m to 2933 m.
10:30	Pulled out with the cement string from 3133 m to 2900 m.
12:00	Reverse circulated at 2900 m.
14:00	Pulled out of the hole from 2900 m to 1358 m.
17:30	Pulled out of the hole laying down 5" drill pipe from 1358 m to 788 m.
18:00	Lubricated the rig.
20:30	Pulled out of the hole laying down 5" drill pipe from 788 m to 315 m.
22:00	Contiuned pulling out of the hole with the 3 1/2" drill pipe.
22:30	Laid down 1 stand 5" drill pipe from derrick
23:59	Made up 4 stands 5" HWDP below multi-purpose tool and ran in to the wellhead.

Daily report no : 49 **Date:** 1998-12-11
Midnight depth : 3775 m MD **Estimated PP:** 1.23 sg **Mud weight:** 1.30 sg

Stop time	Description
00:30	Latched retrieving tool and pulled out with the wear bushing
01:30	Ran in with the multi-purpose tool to 110 m.
02:00	Lubricated the rig.
05:00	Repaired faulty isolation valve on DSC.
07:00	Retrieved seal assembly with closed annular. Flow checked. Circulated 10 m3 down kill and up choke line. Pulled out of the hole and laid down the seal assembly.
10:30	Made up the 9 5/8" casing cutting assembly and ran in the hole to 2029 m.
11:30	Made up the marine swivel.
12:00	Ran in with the hwdp landing string.
12:30	Cut the 9 5/8" casing at 2162 m.
15:30	Pulled out of the hole and racked the marine swivel and casing cutter in the derrick.
16:30	Made up the 9 5/8"spear assembly
17:30	Moved casing modem to rig floor and rigged up the same.
20:00	Continued making up spear assembly and ran in to the wellhead. Engaged spear and pulled 9 5/8" casing free with no overpull.
22:30	Pumped a 10 m3 slug and pulled out with the spear assembly landing string and 9 5/8" casing.
23:59	Rigged up 9 5/8" casing equipment.

Daily report no : 50 **Date:** 1998-12-12
Midnight depth : 3775 m MD **Estimated PP:** 1.23 sg **Mud weight:** 1.30 sg

Stop time	Description
00:30	Continued to rig up casing equipment.
14:30	Pulled out of the hole and laid down 9 5/8" casing.
15:30	Rigged down casing equipment and tong modem.
19:30	Made up the 13 3/8" CZSV packer on 5" drill pipe and ran in the hole to 2158m.
20:00	Set the EZSV packer at 2158 m.
20:30	Pressure tedsted the EZSV packer to 165 bar.
21:30	Circulated and conditioned the mud.
22:30	Set a balanced cement plug in 13 3/8" casing from 2155 m to 2055 m.
23:00	Pulled out of the hole with cement string to 2030 m.
23:59	Reverse circulated out excess cement.

DAILY REPORT ON WELL 30/9-19 A

Daily report no : 51 **Date:** 1998-12-13

Midnight depth : 3775 m MD **Estimated PP:** 1.23 sg **Mud weight:** 1.30 sg

Stop time	Description
00:30	Circulated long way 1 1/2 string volumes.
01:30	Pulled out of the hole from 2030 m to 1511 m.
08:00	Pulled out of the hole and laid down 53 stands 5 " drill pipe from 1511 m to 230 m.
08:30	Lubricated/serviced the rig.
09:30	Made up the DrillQuip Multi Utility Tool and ran in to the wellhead.
11:00	Retrieved seal assembly with closed annular. Flow checked, circulated 20 m3 1.30 sg mud down kill line and up chokeline. No gas. Flow checked.
12:30	Pulled out of the hole and laid down the 13 3/8" seal assembly and Multi Utility Tool.
14:00	Pulled out of the hole and laid down 5" drill pipe from 230 m.
16:00	Made up the 13 3/8" casing cut assembly and ran in to 516 m. Installed the swivel and continued running in to 652 m. Cut the casing at 652m.
18:00	Pulled out of the hole with the cutting assembly.
20:00	Made up the spear assembly and ran in to the wellhead. Engaged the spear in the 13 3/8" hanger.
21:00	Pulled the 13 3/8" casing free with no overpull. Flow checked and circulated bottoms up.
22:30	Pumped 10 m3 slug. Pulled out with the 13 3/8" casing. Pulled into tight spot with 13 3/8" hanger 35 m above wellhead. 8 ton maximum overpull. The spear released from the hanger and the hanger and casing fell 35 m to the wellhead.
23:59	Pulled out with the spear assembly, landing string and 13 3/8" casing.

Daily report no : 52 **Date:** 1998-12-14

Midnight depth : 3775 m MD **Estimated PP:** 1.23 sg **Mud weight:** 1.30 sg

Stop time	Description
01:30	Rigged up the 13 3/8" casing handling equipment.
03:00	Pulled out and laid down the 13 3/8" casing from 520 m to 430 m.
03:30	Pulled the spider slips and removed 3 damaged casing hanger rings from the casing joint.
06:30	Continued pulling out of the hole laying down the 13 3/8" casing from 430 m.
08:00	Rigged down the casing equipment.
09:30	Made up the Parabow on 5" drill pipe and ran in the hole to 603 m.
11:30	Broke circulation with 500 l/min. Dropped the ball and extruded the Parabow with 60 bar. Picked up string to 600 m. Circulated and conditioned the mud.
13:00	Set a balanced cement plug in the 20" casing from 600 m to 400 m.
13:30	Pulled out of the hole to 370 m.
14:30	Reverse circulated 1 1/2 string volumes.
15:00	Pulled out of the hole to 196 m.
17:00	Continued pulling out of the hole and laid down 7 stands 5" drill pipe.
18:30	Laid down spear assembly from the derrick
21:30	Made up the 20"/30" casing cutting assembly and racked back in derrick.
23:00	Laid down 18 joints 3 1/2" drill pipe from derrick.
23:59	Made up the bullnose sub on 5" drill pipe and ran in the hole to 370 m.

Daily report no : 53 **Date:** 1998-12-15

Midnight depth : 408 m MD **Estimated PP:** sg **Mud weight:** 1.34 sg

Stop time	Description
01:00	Slipped and cut the drilling line.
02:00	Tagged the cement plug top in 20" casing at 408 m.
03:00	Pressure tested the cement plug to 110 bar.
04:00	Pulled out to 250 m.
05:00	Displaced hole/riser with seawater
06:00	Pulled out of the hole with the bullnose.
08:30	Rigged up for pulling of BOP.
23:00	Waited on weather to pull BOP.
23:59	Laid out diverter housing.

Daily report no : 54 **Date:** 1998-12-16

Midnight depth : 0 m MD **Estimated PP:** sg **Mud weight:** 1.34 sg

Stop time	Description
02:00	Made up landing joint, retracted and locked slip joint.

DAILY REPORT ON WELL 30/9-19 A

Daily report no : 54 **Date:** 1998-12-16

Midnight depth : 0 m MD **Estimated PP:** sg **Mud weight:** 1.34 sg

Stop time	Description
03:30	ROV was unable to locate BOP due to sonar/gyro failure.
06:30	Disconnected and pulled BOP clear of guide posts. Moved rig 20 m off location.
11:00	Pulled BOP
13:30	Landed BOP on forklift. Disconnected riser and removed guide lines. Parked BOP and laid down 2 last riser joints.
14:30	Rigged down riser handling equipment.
15:00	Serviced hoisting equipment.
18:00	Made up wellhead cutting and retrieval assembly and ran in to 130 m.
19:00	Entered wellhead.
22:30	Cut surface casing and conductor at 141 m.
23:00	Pulled wellhead to 80 m.
23:30	Freed entangled ROV umbilical from wellhead.
23:59	Pulled wellhead to surface and landed on trolley.

Daily report no : 55 **Date:** 1998-12-17

Midnight depth : 0 m MD **Estimated PP:** sg **Mud weight:** 1.34 sg

Stop time	Description
00:30	Secured permanent guide base on trolley.
01:30	Unlatched retrieving tool and laid down cutter assembly.
04:30	Released wellhead from permanent guide base. Retrieved and laid down wellhead with casing stumps.
05:00	Rigged down wellhead handling equipment.
15:00	Waited on weather to start anchor handling. Viking Titan at location 20:30.
23:59	No activity on well 30/9-19 A. Back on budget on well 30/9-19.

TIME DISTRIBUTION

Well: 30/9-19 A **PO:** 1 **Start date:** 1980-01-01 **Rig:** WEST DELTA **Depth:** 3775.0 **m MD**
All sections **Stop date:** 1999-04-22

Operations	Hours	%	Hours	%	Acc. total
DRILLING					
BHA HANDLING/TESTING	39.0	2.99			
MWD HANDLING/TESTING/SURVEYING	1.5	0.12			
TRIPPING IN CASED HOLE	43.0	3.30			
TRIPPING IN OPEN HOLE	14.0	1.07			
DRILLING	176.0	13.50			
OTHER	24.5	1.88			
WELLHEAD EQUIPMENT INSTALLATION	2.5	0.19			
REAMING	5.0	0.38			
CIRC. AND COND. MUD/HOLE	18.0	1.38			
WIPER TRIP	29.0	2.22			
SURVEYING	6.5	0.50			
CASING HANDLING/TESTING	13.0	1.00			
RUNNING CASING IN CASED HOLE	18.5	1.42			
RUNNING CASING IN OPEN HOLE	7.0	0.54			
DRILLING OUT OF CASING	3.5	0.27			
PRIMARY CEMENTING	3.5	0.27			
TRIPPING FOR CEMENT JOB	18.5	1.42			
DRILLING OUT CEMENT PLUG	9.0	0.69			
FORMATION STRENGTH TESTING	2.0	0.15			
BOP TESTING	13.5	1.04			
SET CEMENT PLUG	11.5	0.88			
TRIPPING OF CASING CUTTING EQUIPMENT	11.0	0.84			
CUT CASING/WELLHEAD	1.5	0.12			
CASING RETRIEVING	24.0	1.84			
SLIP AND CUT DRILLING LINE	2.0	0.15			
Sum.			497.5	38.15	497.5
FORMATION EVALUATION LOGGING					
LOGGING	55.5	4.26			
LOGGING EQUIPMENT HANDLING/TESTING	20.0	1.53			
TRIPPING IN CASED HOLE	9.0	0.69			
TRIPPING IN OPEN HOLE	4.5	0.35			
OTHER	3.5	0.27			
Sum.			92.5	7.09	590.0
FORMATION EVALUATION CORING					
BHA HANDLING/TESTING	5.0	0.38			
CIRCULATING FOR SAMPLE	5.0	0.38			
TRIPPING IN CASED HOLE	11.5	0.88			
CORING EQUIPMENT/CORE HANDLING	3.0	0.23			
TRIPPING IN OPEN HOLE	2.0	0.15			
OTHER	1.5	0.12			
CORING	1.0	0.08			
CIRC. AND COND. MUD/HOLE	3.5	0.27			
Sum.			32.5	2.49	622.5
TESTING (PRODUCTION TEST)					
BOTTOMHOLE SAMPLING	15.5	1.19			
PERFORATE	1.0	0.08			
RUN LOGS FOR CORRELATION	4.5	0.35			
BHA HANDLING/TESTING	3.0	0.23			
TRIPPING IN CASED HOLE	12.0	0.92			
OTHER	13.0	1.00			
CIRC. AND COND. MUD/HOLE	1.5	0.12			
CASING HANDLING/TESTING	7.5	0.58			
RUNNING CASING IN CASED HOLE	5.0	0.38			
PRIMARY CEMENTING	7.5	0.58			
TRIPPING FOR CEMENT JOB	11.5	0.88			
CEMENT EVALUATION	6.0	0.46			
BOP TESTING	6.0	0.46			
PULLING OUT OF HOLE W/PRODUCTION STRING	31.5	2.42			
PRESSURE TESTING OF DOWNHOLE EQUIPMENT	10.0	0.77			
SET MECHANICAL PLUG	8.0	0.61			

TIME DISTRIBUTION

Well: 30/9-19 A **PO:** 1 **Start date:** 1980-01-01 **Rig:** WEST DELTA **Depth:** 3775.0 **m MD**
All sections **Stop date:** 1999-04-22

Operations	Hours	%	Hours	%	Acc. total
TESTING (PRODUCTION TEST)					
INSTALLATION OF PRODUCTION STRING	48.0	3.68			
RIG UP OR DOWN WIRELINE EQUIPMENT	14.0	1.07			
FLOW PERIOD	33.0	2.53			
KILL WELL/MINIFRAC	12.0	0.92			
SHUT IN PERIOD	23.5	1.80			
Sum.			274.0	21.01	896.5
PLUG AND ABANDONMENT					
TRIPPING IN CASED HOLE	15.5	1.19			
OTHER	18.0	1.38			
WELLHEAD EQUIPMENT INSTALLATION	9.0	0.69			
CIRC. AND COND. MUD/HOLE	5.5	0.42			
CASING HANDLING/TESTING	8.0	0.61			
TRIPPING FOR CEMENT JOB	22.5	1.73			
BOP HANDLING	2.5	0.19			
BOP RUNNING/RETRIEVING	7.5	0.58			
WELLHEAD EQUIPMENT HANDLING	4.5	0.35			
SET CEMENT PLUG	12.0	0.92			
SET MECHANICAL PLUG	1.0	0.08			
TRIPPING OF CASING CUTTING EQUIPMENT	24.5	1.88			
CUT CASING/WELLHEAD	4.0	0.31			
CASING RETRIEVING	20.5	1.57			
SLIP AND CUT DRILLING LINE	1.0	0.08			
Sum.			156.0	11.96	1052.5
DOWNTIME MOBILIZATION					
WAITING	10.0	0.77			
Sum.			10.0	0.77	1062.5
DOWNTIME DRILLING					
EQUIPMENT FAILURE AND REPAIR	93.5	7.17			
WAITING	5.0	0.38			
OTHER	10.0	0.77			
Sum.			108.5	8.32	1171.0
DOWNTIME FORM. EVAL. LOGGING					
EQUIPMENT FAILURE AND REPAIR	2.0	0.15			
WAITING	5.0	0.38			
OTHER	49.0	3.76			
Sum.			56.0	4.29	1227.0
DOWNTIME FORM. EVAL. CORING					
EQUIPMENT FAILURE AND REPAIR	0.5	0.04			
Sum.			0.5	0.04	1227.5
DOWNTIME TESTING (PROD. TEST)					
EQUIPMENT FAILURE AND REPAIR	24.0	1.84			
WAITING	32.5	2.49			
OTHER	1.0	0.08			
Sum.			57.5	4.41	1285.0
DOWNTIME PLUG AND ABANDONMENT					
EQUIPMENT FAILURE AND REPAIR	4.5	0.35			
WAITING	14.5	1.11			
Sum.			19.0	1.46	1304.0

Reported time (100.0 % of well total 1304.0 hours) : 1304.0

Norsk Hydro

1999-04-22

HOLE DEVIATION

Well: 30/9-19 A **Reference point:** RKB ; 29.0 m ABOVE MSL

Waterdepth: 105.0 m **Vertical to:** 133.9 m **Total Depth:** 3775.0 m MD

Utm zone: 31 **Central Median:** 3' E **Horizontal datum:** ED50

Template Centre Coordinates, UTM: **North :** m, **East:** m

Wellhead Coordinates, UTM: **North :** 6702819.90 m, **East:** 483176.90 m

Official Surveys: Y **Track :**

Coordinates are measured from the wellhead centre.

Depth MD [m]	Incli-nation [Deg]	Direc-tion [Deg]	Tool Type	#	Depth TVD [m]	Coordinates North [m]	Coordinates East [m]	Vert. Sect [m]	Dogleg [D/30m]	Build [D/30m]	Turn [D/30m]
134.0	0.00	0.00	MWD		134.0	0.00	0.00	0.0	0.00	0.00	0.00
141.0	0.14	69.90	MWD		141.0	0.00	0.01	0.0	0.60	0.60	299.57
152.4	0.62	139.20	MWD		152.4	-0.04	0.06	0.1	1.54	1.26	182.37
157.0	0.40	140.50	MWD		157.0	-0.07	0.09	0.1	1.44	-1.43	8.48
165.9	0.32	155.70	MWD		165.9	-0.12	0.12	0.2	0.42	-0.27	51.24
179.4	0.15	206.80	MWD		179.4	-0.17	0.13	0.2	0.56	-0.38	113.56
188.0	0.25	164.20	MWD		188.0	-0.20	0.13	0.2	0.60	0.35	-148.60
196.4	0.15	214.20	MWD		196.4	-0.22	0.12	0.3	0.68	-0.36	178.57
205.6	0.54	160.80	MWD		205.6	-0.27	0.13	0.3	1.52	1.27	-174.13
219.3	0.67	226.30	MWD		219.3	-0.39	0.10	0.4	1.45	0.28	143.43
267.8	0.12	110.30	MWD		267.8	-0.60	-0.06	0.6	0.45	-0.34	-71.75
323.5	0.69	358.64	MWD		323.5	-0.29	-0.02	0.3	0.40	0.31	-60.11
381.1	0.16	7.73	MWD		381.1	0.14	-0.01	0.1	0.28	-0.28	4.73
438.1	0.32	66.10	MWD		438.1	0.28	0.14	0.3	0.14	0.08	30.74
495.3	0.42	71.81	MWD		495.3	0.41	0.49	0.6	0.06	0.05	3.00
554.0	0.41	107.23	MWD		554.0	0.42	0.89	1.0	0.13	-0.01	18.11
610.8	0.46	81.20	MWD		610.7	0.39	1.31	1.4	0.11	0.03	-13.75
667.4	0.20	28.40	MWD		667.4	0.51	1.58	1.7	0.20	-0.14	-27.94
724.5	0.67	47.70	MWD		724.5	0.83	1.88	2.1	0.26	0.25	10.15
749.8	0.19	58.90	MWD		749.8	0.95	2.02	2.2	0.58	-0.57	13.28
812.6	0.56	125.90	MWD		812.6	0.82	2.36	2.5	0.25	0.18	32.02
869.5	0.43	59.70	MWD		869.5	0.77	2.77	2.9	0.29	-0.07	-34.88
927.1	0.73	218.70	MWD		927.1	0.59	2.73	2.8	0.59	0.16	82.81
955.5	0.85	220.50	MWD		955.5	0.29	2.48	2.5	0.13	0.13	1.90
984.5	0.92	227.50	MWD		984.5	-0.03	2.17	2.2	0.13	0.07	7.24
1013.6	1.41	231.39	MWD		1013.5	-0.41	1.72	1.8	0.51	0.51	4.02
1042.3	0.74	259.60	MWD		1042.3	-0.67	1.26	1.4	0.87	-0.70	29.44
1070.5	0.81	223.10	MWD		1070.5	-0.85	0.94	1.3	0.52	0.07	-38.83
1099.9	0.43	228.90	MWD		1099.9	-1.07	0.72	1.3	0.39	-0.39	5.92
1127.8	1.17	255.80	MWD		1127.8	-1.21	0.36	1.3	0.87	0.80	28.92
1156.2	1.75	265.20	MWD		1156.1	-1.32	-0.35	1.4	0.66	0.61	9.93
1184.0	1.44	272.80	MWD		1183.9	-1.34	-1.12	1.7	0.40	-0.33	8.20
1203.0	1.29	271.30	MWD		1202.9	-1.32	-1.58	2.1	0.24	-0.24	-2.37
1231.3	1.28	274.20	MWD		1231.2	-1.29	-2.21	2.6	0.07	-0.01	3.07
1260.0	1.22	273.60	MWD		1259.9	-1.25	-2.83	3.1	0.06	-0.06	-0.63
1288.0	1.21	275.30	MWD		1287.9	-1.20	-3.43	3.6	0.04	-0.01	1.82

Norsk Hydro

1999-04-22

HOLE DEVIATION

Well: 30/9-19 A **Reference point:** RKB ; 29.0 m ABOVE MSL

Waterdepth: 105.0 m **Vertical to:** 133.9 m **Total Depth:** 3775.0 m MD

Utm zone: 31 **Central Median:** 3' E **Horizontal datum:** ED50

Template Centre Coordinates, UTM: **North :** m, **East :** m

Wellhead Coordinates, UTM: **North :** 6702819.90 m, **East :** 483176.90 m

Official Surveys: Y **Track :**

Coordinates are measured from the wellhead centre.

Depth MD [m]	Incli-nation [Deg]	Direc-tion [Deg]	Tool Type	#	Depth TVD [m]	Coordinates North [m]	Coordinates East [m]	Vert. Sect [m]	Dogleg [D/30m]	Build [D/30m]	Turn [D/30m]
1316.9	1.22	278.60	MWD		1316.8	-1.13	-4.03	4.2	0.07	0.01	3.43
1346.1	1.17	279.60	MWD		1346.0	-1.03	-4.64	4.7	0.06	-0.05	1.03
1375.0	1.13	282.30	MWD		1374.9	-0.92	-5.20	5.3	0.07	-0.04	2.80
1404.2	1.20	282.60	MWD		1404.1	-0.79	-5.78	5.8	0.07	0.07	0.31
1433.1	1.14	283.60	MWD		1433.0	-0.66	-6.36	6.4	0.07	-0.06	1.04
1462.5	1.02	285.90	MWD		1462.4	-0.52	-6.90	6.9	0.13	-0.12	2.35
1491.0	1.04	295.70	MWD		1490.9	-0.34	-7.37	7.4	0.19	0.02	10.32
1519.5	1.14	303.30	MWD		1519.4	-0.07	-7.84	7.8	0.18	0.11	8.00
1548.5	1.18	303.50	MWD		1548.4	0.25	-8.33	8.3	0.04	0.04	0.21
1576.8	1.14	338.30	MWD		1576.7	0.68	-8.68	8.7	0.74	-0.04	36.89
1606.7	1.12	342.80	MWD		1606.5	1.23	-8.88	9.0	0.09	-0.02	4.52
1634.9	1.09	345.50	MWD		1634.7	1.76	-9.02	9.2	0.06	-0.03	2.88
1662.2	1.11	345.90	MWD		1662.0	2.26	-9.15	9.4	0.02	0.02	0.44
1692.1	1.15	356.30	MWD		1692.0	2.84	-9.24	9.7	0.21	0.04	10.42
1720.4	1.19	4.90	MWD		1720.2	3.42	-9.24	9.8	0.19	0.04	9.14
1748.9	1.12	16.30	MWD		1748.7	3.98	-9.13	10.0	0.25	-0.07	11.98
1778.1	1.15	48.20	MWD		1777.9	4.45	-8.84	9.9	0.64	0.03	32.77
1808.0	1.28	54.40	MWD		1807.8	4.85	-8.34	9.6	0.19	0.13	6.22
1835.7	1.32	57.90	MWD		1835.5	5.20	-7.82	9.4	0.10	0.04	3.79
1863.6	1.26	63.20	MWD		1863.4	5.50	-7.27	9.1	0.14	-0.06	5.70
1892.9	1.05	73.40	MWD		1892.7	5.73	-6.73	8.8	0.30	-0.22	10.44
1920.2	1.01	104.80	MWD		1920.0	5.74	-6.25	8.5	0.61	-0.04	34.51
1948.7	0.98	108.40	MWD		1948.5	5.60	-5.78	8.0	0.07	-0.03	3.79
1978.2	1.05	111.20	MWD		1978.0	5.42	-5.29	7.6	0.09	0.07	2.85
2007.9	1.10	107.40	MWD		2007.7	5.23	-4.76	7.1	0.09	0.05	-3.84
2036.0	1.05	105.70	MWD		2035.8	5.08	-4.26	6.6	0.06	-0.05	-1.81
2064.4	1.11	103.60	MWD		2064.2	4.95	-3.74	6.2	0.08	0.06	-2.22
2092.9	1.15	103.40	MWD		2092.7	4.82	-3.19	5.8	0.04	0.04	-0.21
2121.4	1.17	98.10	MWD		2121.1	4.71	-2.63	5.4	0.11	0.02	-5.58
2149.9	1.14	97.80	MWD		2149.6	4.63	-2.06	5.1	0.03	-0.03	-0.32
2178.8	1.02	96.70	MWD		2178.5	4.56	-1.52	4.8	0.13	-0.12	-1.14
2207.2	0.95	93.90	MWD		2206.9	4.52	-1.03	4.6	0.09	-0.07	-2.96
2236.0	0.80	94.80	MWD		2235.7	4.48	-0.59	4.5	0.16	-0.16	0.94
2263.6	0.83	89.70	MWD		2263.3	4.47	-0.20	4.5	0.08	0.03	-5.54
2291.9	0.77	89.60	MWD		2291.6	4.47	0.19	4.5	0.06	-0.06	-0.11
2301.5	0.80	92.80	MWD		2301.2	4.47	0.32	4.5	0.16	0.09	10.04

Norsk Hydro

1999-04-22

HOLE DEVIATION

Well: 30/9-19 A **Reference point:** RKB ; 29.0 m ABOVE MSL

Waterdepth: 105.0 m **Vertical to:** 133.9 m **Total Depth:** 3775.0 m MD

Utm zone: 31 **Central Median:** 3' E **Horizontal datum:** ED50

Template Centre Coordinates, UTM: **North :** m, **East :** m

Wellhead Coordinates, UTM: **North :** 6702819.90 m, **East :** 483176.90 m

Official Surveys: Y **Track :**

Coordinates are measured from the wellhead centre.

Depth MD [m]	Incli-nation [Deg]	Direc-tion [Deg]	Tool Type	#	Depth TVD [m]	Coordinates North [m]	Coordinates East [m]	Vert. Sect [m]	Dogleg [D/30m]	Build [D/30m]	Turn [D/30m]
2322.0	0.75	86.70	MWD		2321.7	4.47	0.60	4.5	0.14	-0.07	-8.91
2343.3	2.12	127.80	MWD		2343.0	4.24	1.05	4.4	2.30	1.93	57.89
2352.3	2.10	141.30	MWD		2352.0	4.00	1.29	4.2	1.65	-0.07	45.00
2360.9	1.67	197.60	MWD		2360.6	3.76	1.35	4.0	6.36	-1.50	196.85
2372.0	2.45	217.00	MWD		2371.7	3.42	1.16	3.6	2.79	2.10	52.34
2381.9	4.00	233.80	MWD		2381.5	3.05	0.75	3.1	5.48	4.72	51.17
2392.7	5.26	238.40	MWD		2392.3	2.57	0.03	2.6	3.65	3.50	12.78
2409.3	7.01	237.60	MWD		2408.9	1.62	-1.49	2.2	3.15	3.15	-1.44
2435.8	8.21	246.50	MWD		2435.1	0.00	-4.58	4.6	1.90	1.36	10.09
2466.3	7.95	247.10	MWD		2465.3	-1.69	-8.52	8.7	0.27	-0.26	0.59
2495.1	7.71	247.00	MWD		2493.8	-3.22	-12.14	12.6	0.25	-0.25	-0.10
2525.5	8.59	253.20	MWD		2523.9	-4.67	-16.19	16.8	1.23	0.87	6.12
2554.1	10.15	268.80	MWD		2552.2	-5.34	-20.75	21.4	3.11	1.64	16.36
2583.2	12.80	269.70	MWD		2580.7	-5.41	-26.54	27.1	2.74	2.73	0.93
2609.5	15.77	271.70	MWD		2606.2	-5.32	-33.03	33.5	3.43	3.39	2.28
2637.7	18.76	274.90	MWD		2633.1	-4.82	-41.38	41.7	3.34	3.18	3.40
2667.4	21.67	275.30	MWD		2661.0	-3.91	-51.60	51.7	2.94	2.94	0.40
2696.5	22.78	278.80	MWD		2687.9	-2.55	-62.52	62.6	1.78	1.14	3.61
2725.4	25.46	272.50	MWD		2714.2	-1.42	-74.24	74.3	3.86	2.78	-6.55
2754.9	27.87	270.80	MWD		2740.6	-1.05	-87.46	87.5	2.57	2.45	-1.73
2782.8	28.81	269.50	MWD		2765.2	-1.02	-100.73	100.7	1.21	1.01	-1.40
2812.5	29.17	269.40	MWD		2791.2	-1.15	-115.13	115.1	0.37	0.36	-0.10
2840.9	31.36	269.70	MWD		2815.7	-1.27	-129.46	129.5	2.32	2.31	0.32
2871.4	32.65	270.10	MWD		2841.6	-1.29	-145.60	145.6	1.29	1.27	0.39
2900.1	32.63	269.90	MWD		2865.8	-1.29	-161.10	161.1	0.11	-0.02	-0.21
2928.1	32.13	270.00	MWD		2889.4	-1.31	-176.09	176.1	0.54	-0.54	0.11
2956.5	32.05	269.90	MWD		2913.4	-1.32	-191.16	191.2	0.10	-0.08	-0.11
2985.2	32.11	270.20	MWD		2937.7	-1.31	-206.40	206.4	0.18	0.06	0.31
3012.6	31.60	270.20	MWD		2961.0	-1.26	-220.87	220.9	0.56	-0.56	0.00
3040.9	31.15	270.80	MWD		2985.2	-1.13	-235.60	235.6	0.58	-0.48	0.64
3070.3	30.68	270.20	MWD		3010.4	-1.00	-250.70	250.7	0.57	-0.48	-0.61
3097.8	32.12	270.50	MWD		3033.9	-0.91	-265.04	265.0	1.58	1.57	0.33
3128.4	34.03	270.90	MWD		3059.5	-0.70	-281.73	281.7	1.88	1.87	0.39
3156.1	34.47	271.20	MWD		3082.4	-0.42	-297.30	297.3	0.51	0.48	0.33
3172.5	34.40	271.60	MWD		3096.0	-0.19	-306.61	306.6	0.43	-0.13	0.73
3217.7	35.08	272.50	MWD		3133.1	0.73	-332.32	332.3	0.57	0.45	0.60

Norsk Hydro

1999-04-22

HOLE DEVIATION

Well: 30/9-19 A **Reference point:** RKB ; 29.0 m ABOVE MSL

Waterdepth: 105.0 m **Vertical to:** 133.9 m **Total Depth:** 3775.0 m MD

Utm zone: 31 **Central Median:** 3' E **Horizontal datum:** ED50

Template Centre Coordinates, UTM: **North :** m, **East:** m

Wellhead Coordinates, UTM: **North :** 6702819.90 m, **East:** 483176.90 m

Official Surveys: Y **Track :**

Coordinates are measured from the wellhead centre.

Depth MD [m]	Incli-nation [Deg]	Direc-tion [Deg]	Tool Type	#	Depth TVD [m]	Coordinates North [m]	Coordinates East [m]	Vert. Sect [m]	Dogleg [D/30m]	Build [D/30m]	Turn [D/30m]
3246.4	35.34	271.20	MWD		3156.5	1.27	-348.85	348.9	0.83	0.27	-1.36
3273.9	35.54	271.40	MWD		3178.9	1.63	-364.81	364.8	0.25	0.22	0.22
3284.6	35.75	270.80	MWD		3187.6	1.75	-371.04	371.0	1.14	0.59	-1.68
3305.2	35.99	270.90	MWD		3204.3	1.93	-383.11	383.1	0.36	0.35	0.15
3323.6	35.96	271.00	MWD		3219.2	2.11	-393.93	393.9	0.11	-0.05	0.16
3354.1	35.68	271.30	MWD		3243.9	2.46	-411.75	411.8	0.33	-0.28	0.30
3382.7	33.94	271.30	MWD		3267.4	2.84	-428.07	428.1	1.83	-1.83	0.00
3411.8	32.96	271.05	MWD		3291.7	3.16	-444.12	444.1	1.02	-1.01	-0.26
3439.3	30.95	270.10	MWD		3315.0	3.31	-458.67	458.7	2.26	-2.19	-1.04
3467.9	27.76	269.00	MWD		3340.0	3.21	-472.70	472.7	3.39	-3.34	-1.15
3496.3	24.47	266.00	MWD		3365.5	2.68	-485.18	485.2	3.75	-3.48	-3.17
3524.0	22.99	265.44	MWD		3390.9	1.85	-496.30	496.3	1.62	-1.60	-0.61
3552.4	21.15	266.20	MWD		3417.2	1.07	-506.94	506.9	1.97	-1.94	0.80
3580.7	19.41	264.00	MWD		3443.7	0.24	-516.70	516.7	2.02	-1.85	-2.34
3609.0	17.52	262.60	MWD		3470.5	-0.80	-525.61	525.6	2.06	-2.00	-1.48
3637.2	15.56	260.72	MWD		3497.6	-1.95	-533.55	533.6	2.16	-2.09	-2.00
3664.7	14.44	257.75	MWD		3524.1	-3.27	-540.53	540.5	1.48	-1.22	-3.24
3693.7	14.39	251.44	MWD		3552.2	-5.19	-547.48	547.5	1.63	-0.05	-6.53
3722.0	13.52	249.05	MWD		3579.7	-7.49	-553.91	554.0	1.11	-0.92	-2.53
3756.1	10.24	246.25	MWD		3613.0	-10.14	-560.41	560.5	2.93	-2.88	-2.46
3775.0	10.00	246.00	MWD		3631.7	-11.48	-563.45	563.6	0.39	-0.38	-0.40

MAIN CONSUMPTION OF CASING/TUBING ON WELL 30/9-19 A PO: 1

Size	Casing string	Grade	Weight [kg/m]	Weight [lb/ft]	Threads type	Length [m]	No. of joints
30"	CONDUCTOR	X-52	234.38	157.50	SL-60	99.1	6
20"	SURFACE	X-56	197.92	133.00	E60MT	1067.5	88
13 3/8"	INTERMEDIATE	P-110	107.14	72.00	NS-CC	2186.2	191
9 5/8"	INTERMEDIATE	P-110	79.61	53.50	NS-CC	3055.1	258
7"	PRODUCTION LINER	P-110	43.15	29.00	NK 3 SB	735.7	59

BITRECORD FOR WELL 30/9-19 A PO: 1

Bit No	RR	Type	Size (in)	Manu-fact-urer	Trade name	Serial no.	IADC code	Nozzles diameter (../32in)	Flow area (in2)	BHA no.	Depth out (m MD)	Bit meter (m)	Rot. hours (hrs)	ROP (m/hr)	Rotation min/max) (rpm)	Total bit revol.	Weight min/max (kN)	Flow min/max (l/min)	Pump min/max (bar)	Cutting Structure I - O -DC- L - B	Gauge 1/16 (in)	Other Remarks	Pull Cause
1		MILL	8.50	REDB	TAPERMILL	RB17788		22,22,22,22,22,22	2.227	1	2372	0		0.0									
2		MILL	8.50	REDB	JUNKMILL	RB10849			0.000	3	134	0		0.0									
3		ISRT	12.25	HTC	MXC09DX	B80DA	437	18,20,20,20	1.169	6	2372	132	7.44	17.7	98/100	7470	10/115	3260/3270	175/178	4 - 4 - JD - A - E	I	NO	BHA
4		MITO	12.25	SDBS	MM44NG	727401	215M	22,22,22	1.114	8	2428	155	13.33	11.6	98/189	108000	10/290	3190/4165	170/250	2 - 2 - WT - A - E	I	NO	PR
5		PDC	12.25	SDBS	FS2743RI	5971589	S243	14,14,14,15,15,15	1.141	9	2522	94	4.63	20.3	114/173	45000	40/180	3800/4030	245/258	1 - 1 - NO - A - X	I	NO	UBDT
6		ISRT	12.25	HTC	EP4556	X90YD	435	14,20,20,20	1.071	10	2867	345	38.93	8.9	88/170	317000	30/550	2950/3910	177/260	2 - 2 - NO - A - E	I	NO	PR
5	1	PDC	12.25	SDBS	FS2743RI	5971589	S243	14,14,14,15,15,15	1.141	11	3075	208	15.73	13.2	90/187	152000	30/300	3330/3800	195/270	1 - 1 - BT - S - X	I	NO	DMF
7		ISRT	12.25	HTC	MXC09DDT	B60DF	437	14,20,20,20	1.071	12	3197	122	15.21	8.0	105/174	150000	30/440	3225/3965	196/300	2 - 2 - WT - A - 3	I	NO	TD
8		PDC	8.50	SMIT	M50P	JR3654	M333	11,11,11,12,12,12	0.610	13	3300	103	3.89	26.5	120/160	33000	30/100	1950/2050	155/160	3 - 3 - CT - A - X	I	NO	CP
9		CORE	8.50	SDBS	FC264RILI	7981237	243		0.000	14	3342	42	1.08	38.9	100/110	6000	20/100	980/1160	59/66	3 - 1 - ER - A - X	I	NO	CJ
10		PDC	8.50	SMIT	M50P	JR7012	M333	11,11,11,12,12,12	0.610	15	3342	0		0.0		0				0 - 0 - NO - A - 0	I	NO	DTF
10	1	PDC	8.50	SMIT	M50P	JR7012	M333	11,11,11,12,12,12	0.610	16	3775	433	17.90	24.2	50/150	121000	0/70	1900/2000	145/170	1 - 6 - WT - T - X	I	NO	TD
10	2	PDC	8.50	SMIT	M50P	JR7012	M333	11,11,11,12,12,12	0.610	18	3775	0		0.0	135/150		0/20	1950/2000	150/160	1 - 6 - WT - T - X	I	NO	LOG
11		MILL	6.00	WEAS	MILL	WLN3293D			0.000	19	3445	0		0.0	30/30		0/0	2578/2578	237/237	0 - 0 - NO - A - 0	I	NO	DST

BOTTOM HOLE ASSEMBLIES USED ON WELL 30/9-19 A PO: 1

BHA no. 1: No. / Element / OD(in) / Length(m) Depth In: 2372 m MD Out: 2372 m MD

1	TAPERMILL	8.5	0.82	2	CASING CUTTER	8.063	2.34
3	DRILL PIPE	5.0	2229.16	4	DRILL PIPE	5.0	2.95
5	DRILL PIPE	5.0	5.92	6	OTHER	7.25	1.90
7	X-OVER	7.937	0.64	8	BIT SUB	8.0	2.17
9	X-OVER	8.0	1.02	10	DRILL PIPE	5.0	4.56
11	FLOAT SUB	6.5	0.84	12	SAVER SUB	6.5	0.24
13	OTHER	6.562	4.76				

Reason pulled: Sum: 2257.32

BHA no. 2: No. / Element / OD(in) / Length(m) Depth In: 140 m MD Out: 140 m MD

1	SPEAR	7.25	2.72	2	X-OVER	7.937	0.64
3	BIT SUB	8.0	2.17	4	X-OVER	8.0	1.02
5	DRILL COLLAR STEEL	6.437	9.25	6	DRILL COLLAR STEEL	6.125	9.40
7	DRILL COLLAR STEEL	6.375	8.94	8	DRILL COLLAR STEEL	6.25	9.26
9	DRILL COLLAR STEEL	6.937	9.27	10	DRILL COLLAR STEEL	6.5	9.08

Reason pulled: Sum: 61.75

BHA no. 3: No. / Element / OD(in) / Length(m) Depth In: 134 m MD Out: 134 m MD

1	JUNKMILL	8.5	0.62	2	BIT SUB	6.437	0.78

Reason pulled: Sum: 1.40

BHA no. 4: No. / Element / OD(in) / Length(m) Depth In: m MD Out: m MD

1	DRILL PIPE		1.98	2	X-OVER	6.5	1.10
3	DRILL PIPE	5.0	146.22	4	OTHER		1.50

Reason pulled: Sum: 147.32

BHA no. 5: No. / Element / OD(in) / Length(m) Depth In: 2468 m MD Out: 2468 m MD

1	OTHER	4.25	2.30	2	X-OVER	4.875	0.42
3	DRILL PIPE	3.5	316.51	4	X-OVER	6.5	1.10

Reason pulled: Sum: 320.33

BHA no. 6: No. / Element / OD(in) / Length(m) Depth In: 2240 m MD Out: 2372 m MD

1	MXC09DX	12.25	0.33	2	DOWNHOLE MOTOR	9.5	9.23
3	NON MAG. STAB	11.875	2.03	4	MWD	8.313	8.65
5	FLOAT SUB	7.5	0.98	6	NON MAG. STAB	11.5	2.10
7	NON MAG. COLLAR	8.0	9.07	8	NON MAG. COLLAR	7.875	8.96
9	DRILL COLLAR STEEL	7.937	9.36	10	DRILL COLLAR STEEL	7.937	9.24
11	DRILL COLLAR STEEL	7.937	9.44	12	DRILL COLLAR STEEL	8.0	9.37
13	JAR	7.937	9.77	14	DRILL COLLAR STEEL	8.0	9.23
15	DRILL COLLAR STEEL	7.75	8.51	16	DRILL COLLAR STEEL	8.0	9.30
17	X-OVER	7.875	1.09	18	HWDP	5.0	81.06

Reason pulled: CHANGE BOTTOMHOLE ASSI Sum: 197.72

BHA no. 7: No. / Element / OD(in) / Length(m) Depth In: 2372 m MD Out: 2372 m MD

1	DRILL PIPE	3.5	258.72	2	X-OVER	6.375	0.36

Reason pulled: Sum: 259.08

Norsk Hydro 1999-04-22

BOTTOM HOLE ASSEMBLIES USED ON WELL 30/9-19 A PO: 1

BHA no. 8: No. / Element / OD(in) / Length(m) Depth In: 2273 m MD Out: 2428 m MD

1	MM44NG	12.25	0.34	2	DOWNHOLE MOTOR	9.5	9.23
3	FLOAT SUB	7.5	0.98	4	NON MAG. STAB	11.875	2.03
5	MWD	8.313	8.65	6	ORIENTING SUB	8.0	0.61
7	NON MAG. STAB	11.5	2.10	8	NON MAG. COLLAR	8.0	9.07
9	NON MAG. COLLAR	7.875	8.96	10	DRILL COLLAR STEEL	7.937	9.36
11	DRILL COLLAR STEEL	7.937	9.24	12	DRILL COLLAR STEEL	7.937	9.44
13	DRILL COLLAR STEEL	8.0	9.37	14	JAR	7.937	9.77
15	DRILL COLLAR STEEL	8.0	9.23	16	DRILL COLLAR STEEL	7.75	8.51
17	DRILL COLLAR STEEL	8.0	9.30	18	X-OVER	7.875	1.09
19	HWDP	5.0	81.06				

Reason pulled: PENETRATION RATE Sum: 198.34

BHA no. 9: No. / Element / OD(in) / Length(m) Depth In: 2428 m MD Out: 2522 m MD

1	FS2743RI	12.25	0.38	2	DOWNHOLE MOTOR	12.125	9.23
3	NON MAG. STAB	11.875	2.03	4	FLOAT SUB	7.5	0.98
5	CDR	8.313	6.80	6	MWD	8.313	8.32
7	NON MAG. STAB	11.875	1.81	8	NON MAG. COLLAR	7.938	8.95
9	NON MAG. COLLAR	7.875	8.96	10	DRILL COLLAR STEEL	7.938	9.36
11	DRILL COLLAR STEEL	7.938	9.24	12	DRILL COLLAR STEEL	7.938	9.44
13	DRILL COLLAR STEEL	8.0	9.37	14	JAR	7.938	9.77
15	DRILL COLLAR STEEL	8.0	9.23	16	DRILL COLLAR STEEL	7.75	9.36
17	DRILL COLLAR STEEL	8.0	9.30	18	X-OVER	7.875	1.09
19	HWDP	5.0	81.52				

Reason pulled: UNEXPECTED BUILD/DROP/T Sum: 205.14

BHA no. 10: No. / Element / OD(in) / Length(m) Depth In: 2522 m MD Out: 2867 m MD

1	EP4556	12.25	0.33	2	DOWNHOLE MOTOR	12.125	9.23
3	NON MAG. STAB	11.875	2.03	4	FLOAT SUB	7.5	0.98
5	CDR	8.313	6.80	6	MWD	8.313	8.32
7	NON MAG. STAB	11.875	1.81	8	NON MAG. COLLAR	7.938	8.95
9	NON MAG. COLLAR	7.875	8.96	10	DRILL COLLAR STEEL	7.938	9.36
11	DRILL COLLAR STEEL	7.938	9.24	12	DRILL COLLAR STEEL	7.938	9.44
13	DRILL COLLAR STEEL	8.0	9.37	14	JAR	7.938	9.77
15	DRILL COLLAR STEEL	8.0	9.23	16	DRILL COLLAR STEEL	7.75	9.36
17	DRILL COLLAR STEEL	8.0	9.30	18	X-OVER	7.875	1.09
19	HWDP	5.0	81.52				

Reason pulled: PENETRATION RATE Sum: 205.09

BHA no. 11: No. / Element / OD(in) / Length(m) Depth In: 2867 m MD Out: 3075 m MD

1	FS2743RI	12.25	0.36	2	DOWNHOLE MOTOR	12.125	9.23
3	FLOAT SUB	7.5	0.98	4	NON MAG. STAB	11.875	2.03
5	CDR	8.313	6.80	6	MWD	8.313	8.32
7	NON MAG. STAB	11.875	1.81	8	NON MAG. COLLAR	7.938	8.95
9	NON MAG. COLLAR	7.875	8.96	10	DRILL COLLAR STEEL	7.938	9.36
11	DRILL COLLAR STEEL	7.938	9.24	12	DRILL COLLAR STEEL	7.938	9.44
13	DRILL COLLAR STEEL	8.0	9.37	14	JAR	7.938	9.77
15	DRILL COLLAR STEEL	8.0	9.23	16	DRILL COLLAR STEEL	7.75	9.36
17	DRILL COLLAR STEEL	8.0	9.30	18	X-OVER	7.875	1.09
19	HWDP	5.0	81.52				

Reason pulled: DOWNHOLE MOTOR FAILURE Sum: 205.12

Norsk Hydro 1999-04-22

BOTTOM HOLE ASSEMBLIES USED ON WELL 30/9-19 A PO: 1

BHA no. 12: No. / Element / OD(in) / Length(m) Depth In: 3075 m MD Out: 3197 m MD

1	MXC09DDT	12.25	0.32	2	DOWNHOLE MOTOR	12.125	9.25
3	NON MAG. STAB	11.25	1.60	4	FLOAT SUB	7.5	0.98
5	CDR	8.313	6.80	6	MWD	8.313	8.32
7	NON MAG. STAB	11.875	1.81	8	NON MAG. COLLAR	7.938	8.95
9	NON MAG. COLLAR	7.875	8.96	10	DRILL COLLAR STEEL	7.938	9.36
11	DRILL COLLAR STEEL	7.938	9.24	12	DRILL COLLAR STEEL	7.938	9.44
13	DRILL COLLAR STEEL	8.0	9.37	14	JAR	7.938	9.77
15	DRILL COLLAR STEEL	8.0	9.23	16	DRILL COLLAR STEEL	7.75	9.36
17	DRILL COLLAR STEEL	8.0	9.30	18	X-OVER	7.875	1.09
19	HWDP	5.0	81.52				

Reason pulled: TOTAL DEPTH/CASING DEPT Sum: 204.67

BHA no. 13: No. / Element / OD(in) / Length(m) Depth In: 3197 m MD Out: 3300 m MD

1	M50P	8.5	0.30	2	NEAR BIT STAB	8.5	1.87
3	CDR	6.875	6.71	4	NON MAG. STAB	8.25	1.36
5	MWD	6.75	8.39	6	NON MAG. STAB	8.5	1.62
7	NON MAG. COLLAR	6.5	8.85	8	NON MAG. COLLAR	6.812	9.22
9	DRILL COLLAR STEEL	6.5	8.83	10	DRILL COLLAR STEEL	6.437	9.00
11	DRILL COLLAR STEEL	6.812	9.07	12	DRILL COLLAR STEEL	6.937	9.27
13	DRILL COLLAR STEEL	6.5	9.08	14	JAR	6.187	9.44
15	DRILL COLLAR STEEL	6.437	9.25	16	DRILL COLLAR STEEL	6.5	9.40
17	DRILL COLLAR STEEL	6.375	8.94	18	HWDP	5.0	108.49

Reason pulled: CORE POINT Sum: 229.09

BHA no. 14: No. / Element / OD(in) / Length(m) Depth In: 3300 m MD Out: 3342 m MD

1	FC264RILI	8.5	0.36	3	CORE BARREL	8.5	57.51
4	FLOAT SUB	6.437	0.84	9	DRILL COLLAR STEEL	6.5	8.83
10	DRILL COLLAR STEEL	6.437	9.00	11	DRILL COLLAR STEEL	6.812	9.07
12	DRILL COLLAR STEEL	6.937	9.27	13	DRILL COLLAR STEEL	6.5	9.08
14	JAR	6.187	9.44	15	DRILL COLLAR STEEL	6.437	9.25
16	DRILL COLLAR STEEL	6.5	9.40	17	DRILL COLLAR STEEL	6.375	8.94
18	HWDP	5.0	81.32				

Reason pulled: CORE JAMMED Sum: 222.31

BHA no. 15: No. / Element / OD(in) / Length(m) Depth In: 3342 m MD Out: 3342 m MD

1	M50P	8.5	0.28	2	BIT SUB	6.5	0.97
3	NON MAG. STAB	8.25	1.96	4	NON MAG. COLLAR	6.75	2.85
5	NON MAG. STAB	8.5	1.13	6	CDR	6.875	6.71
7	MWD	6.75	8.32	8	NON MAG. COLLAR	6.5	8.85
9	DRILL COLLAR STEEL	6.5	8.83	10	DRILL COLLAR STEEL	6.437	9.00
12	DRILL COLLAR STEEL	6.937	9.27	13	DRILL COLLAR STEEL	6.5	9.08
14	JAR	6.187	9.44	15	DRILL COLLAR STEEL	6.437	9.25
16	DRILL COLLAR STEEL	6.5	9.40	17	DRILL COLLAR STEEL	6.375	8.94
18	HWDP	5.0	108.49	19	CDN	8.187	8.74

Reason pulled: DOWNHOLE TOOL FAILURE Sum: 221.51

BOTTOM HOLE ASSEMBLIES USED ON WELL 30/9-19 A PO: 1

BHA no. 16: No. / Element / OD(in) / Length(m) Depth In: 3342 m MD Out: 3775 m MD

1	M50P	8.5	0.28	2	BIT SUB	6.5	0.97
3	NON MAG. STAB	8.25	1.96	4	NON MAG. COLLAR	6.75	2.85
5	NON MAG. STAB	8.5	1.13	6	CDR	6.875	6.71
7	MWD	6.75	8.32	8	NON MAG. COLLAR	6.5	8.85
9	DRILL COLLAR STEEL	6.5	8.83	10	DRILL COLLAR STEEL	6.437	9.00
12	DRILL COLLAR STEEL	6.937	9.27	13	DRILL COLLAR STEEL	6.5	9.08
14	JAR	6.187	9.44	15	DRILL COLLAR STEEL	6.437	9.25
16	DRILL COLLAR STEEL	6.5	9.40	17	DRILL COLLAR STEEL	6.375	8.94
18	HWDP	5.0	108.49	19	CDN	8.187	8.74
21	NON MAG. COLLAR	6.812	9.22				

Reason pulled: TOTAL DEPTH/CASING DEPT Sum: 230.73

BHA no. 17: No. / Element / OD(in) / Length(m) Depth In: 3775 m MD Out: 3775 m MD

1	OTHER		3159.25

BHA no. 18: No. / Element / OD(in) / Length(m) Depth In: 3775 m MD Out: 3775 m MD

1	M50P	8.5	0.28	2	NEAR BIT STAB	8.5	1.68
3	DRILL COLLAR STEEL	6.5	8.83	4	NON MAG. STAB	8.5	1.62
5	DRILL COLLAR STEEL	6.437	9.00	6	NON MAG. STAB	8.5	1.13
7	DRILL COLLAR STEEL	6.937	9.27	8	DRILL COLLAR STEEL	6.813	9.27
9	DRILL COLLAR STEEL	6.5	9.08	10	JAR	6.187	9.44
11	DRILL COLLAR STEEL	6.437	9.25	12	DRILL COLLAR STEEL	6.5	9.40
13	DRILL COLLAR STEEL	6.375	8.94	14	HWDP	5.0	108.49

Reason pulled: RUN LOGS Sum: 195.68

BHA no. 19: No. / Element / OD(in) / Length(m) Depth In: 3445 m MD Out: 3445 m MD

1	MILL	6.059	0.54	2	CASING SCRAPER	5.25	0.95
3	CASING SCRAPER	5.25	0.95	4	BIT SUB	4.75	0.70
5	DRILL PIPE	3.5	404.27	6	POLISH MILL	6.15	5.40
7	BIT SUB	6.375	0.90				

Reason pulled: DRILL STEM TEST Sum: 413.71

BHA no. 20: No. / Element / OD(in) / Length(m) Depth In: m MD Out: m MD

1	MILL	6.0	0.54	2	CASING SCRAPER	7.0	0.95
3	CASING SCRAPER	7.0	0.95	4	BUMPER SUB	4.75	
5	DRILL PIPE	3.5	404.27	6	STRING MILL	6.15	5.40
7	BUMPER SUB	6.375	0.90				

Reason pulled: Sum: 413.01

BHA no. 21: No. / Element / OD(in) / Length(m) Depth In: m MD Out: m MD

1	OTHER	3.5	1.99	2	DRILL PIPE	3.5	316.80
3	X-OVER	6.25	0.37				

Reason pulled: Sum: 319.16

BHA no. 22: No. / Element / OD(in) / Length(m) Depth In: m MD Out: m MD

1	INTERNAL CUTTER	8.25	1.96	2	DRILL PIPE	5.0	2025.16
3	DRILL PIPE	5.0	2.95	4	X-OVER	8.0	0.46
5	X-OVER	14.25	1.96	6	X-OVER	8.0	0.80

Reason pulled: Sum: 2033.29

Norsk Hydro 1999-04-22

BOTTOM HOLE ASSEMBLIES USED ON WELL 30/9-19 A PO: 1

BHA no. 23: No. / Element / OD(in) / Length(m) Depth In: m MD Out: m MD

1	SPEAR	8.188	2.15	2	OTHER	5.63	0.76
3	BUMPER SUB	8.0	3.43	4	JAR	8.0	4.73
5	DRILL PIPE		55.15	6	ACTUATED CIRC. SUB.	8.0	4.25
7	X-OVER	7.875	1.09				

Reason pulled: Sum: 16.41

BHA no. 24: No. / Element / OD(in) / Length(m) Depth In: 408 m MD Out: 408 m MD

1	BULL NOZE	8.0	0.56	2	X-OVER	8.0	0.78

Reason pulled: Sum: 1.34

BHA no. 25: No. / Element / OD(in) / Length(m) Depth In: 141 m MD Out: 141 m MD

CEMENT SLURRY REPORT ON WELL 30/9-19 A

Date	CsgSize	Jobtype	Slurry Type	Pumped Volume [m3]	Density [sg]	BHCT [DegC]	Yield [l/100 kg]	Additive	Unit	Additives [../100 kg Cement]	Additives [../m3 Slurry]
1998-10-26	13 3/8"	PLUG IN CASED TO OPEN HOLE	PREFLUSH	7.40	1.70						
			LEAD	14.90	2.05		66.77	CFR-3L	l	3.00	
								SCR100	kg	1.80	
								HAL600	l	2.50	
								GASCON	l	2.50	
								NF-6	l	0.10	
			SPACER	0.50	1.70						
			DISPLACEMENT	18.50	1.31						
1998-10-29	13 3/8"	PLUG IN CASED TO OPEN HOLE	LEAD	10.40	2.05		66.77	GASCON	l	2.50	
								CFR-3L	l	3.00	
								HAL600	l	2.50	
								NF-6	l	0.10	
								SCR100	kg	1.80	
			SPACER	0.32	1.70						
			PREFLUSH	7.00	1.70						
			DISPLACEMENT	18.45	1.31						
1998-11-13	9 5/8"	CASING CEMENTING	LEAD	13.30	1.90	80.00	102.52	CFR-3L	l	1.50	
								GASCON	l	6.00	
								HAL600	l	6.00	
								NF-6	l	0.10	
								SCR100	kg	2.40	
			SPACER	10.00	1.61	80.00					
			DISPLACEMENT	110.50	1.31	80.00					

CEMENT SLURRY REPORT ON WELL 30/9-19 A

Date	CsgSize	Jobtype	Slurry Type	Pumped Volume [m3]	Density [sg]	BHCT [DegC]	Yield [l/100 kg]	Additive	Unit	Additives [../100 kg Cement]	Additives [../m3 Slurry]
1998-11-26	7"	LINER CEMENTING	PREFLUSH	5.00	1.00						
			LEAD	15.80	1.90		102.41	CFR-3L	l	1.00	
								GASCON	l	6.00	
								HAL600	l	6.00	
								NF-6	l	0.10	
								SCR-L	l	2.90	
			DISPLACEMENT	38.60	1.30						
			SPACER	1.60	1.30						
1998-12-10	7"	PLUG IN CASED HOLE	LEAD	3.90	1.90		102.31	SCR-L	l	1.80	
								CFR-3L	l	1.00	
								GASCON	l	5.50	
								HAL600	l	6.00	
								NF-6	l	0.10	
			SPACER	8.60	1.60						
			DISPLACEMENT	49.50	1.30						
			LEAD NO. 2	5.60	1.90		102.31	CFR-3L	l		1.00
								GASCON	l		5.50
								HAL600	l		6.00
								NF-6	l		0.10
								SCR-L	l		1.80
1998-12-12	13 3/8"	PLUG IN CASED HOLE	LEAD	7.70	1.90		101.00	CFR-3L	l	0.50	
								HR-4L	l	1.00	
								NF-6	l	0.10	
			DISPLACEMENT	17.20	1.30						
			SPACER	5.70	1.60						
1998-12-14	20"	PLUG IN CASED HOLE	DISPLACEMENT	1.90	1.30	22.00					
			LEAD	35.56	1.90	22.00	78.73	CaCl2C	l	2.50	
								NF-6	l	0.10	
			SPACER	21.10	1.03	22.00					

CEMENT CONSUMPTION PER JOB ON WELL 30/9-19 A

Date	CsgSize	Job Type	Cement/ Additive	Description	Unit	Actual Amount Used
1998-10-26	13 3/8"	PLUG IN CASED TO OPEN HOLE	CFR-3L	DISPERSANT: CFR-3 LIQUID	l	800
			GASCON	EDP-C469-91	l	650
			HAL600	FLUID LOSS ADDITIVE: HALAD-600	l	650
			SCR100	RETARDER: SCR-100	kg	250
			NF-5	NF-5	l	20
1998-10-29	13 3/8"	PLUG IN CASED TO OPEN HOLE	CFR-3L	DISPERSANT: CFR-3 LIQUID	l	467
			HAL600	FLUID LOSS ADDITIVE: HALAD-600	l	390
			GASCON	EDP-C469-91	l	390
			SCR100	RETARDER: SCR-100	kg	280
			NF-6	NF-6	l	20
1998-11-13	9 5/8"	CASING CEMENTING	CFR-3L	DISPERSANT: CFR-3 LIQUID	l	203
			GASCON	EDP-C469-91	l	760
			HAL600	FLUID LOSS ADDITIVE: HALAD-600	l	760
			NF-6	NF-6	l	48
			SCR100	RETARDER: SCR-100	kg	300
			SP500	SPACER 500	l	272
1998-11-26	7"	LINER CEMENTING	CFR-3L	DISPERSANT: CFR-3 LIQUID	l	180
			GASCON	EDP-C469-91	l	1050
			HAL600	FLUID LOSS ADDITIVE: HALAD-600	l	1350
			NF-6	NF-6	l	30
			SCR-L	RETARDER: SCR-100L	l	600
1998-12-10	7"	PLUG IN CASED HOLE	CFR-3L	DISPERSANT: CFR-3 LIQUID	l	100
			GASCON	EDP-C469-91	l	530
			HAL600	FLUID LOSS ADDITIVE: HALAD-600	l	600
			NF-6	NF-6	l	35
			SCR-L	RETARDER: SCR-100L	l	250
1998-12-12	13 3/8"	PLUG IN CASED HOLE	CFR-3L	DISPERSANT: CFR-3 LIQUID	l	40
			HR-4L	RETARDER: HR-4L, LIQUID	l	80
			NF-6	NF-6	l	30
1998-12-14	20"	PLUG IN CASED HOLE	CaCl2C	CaCl2 / ACCELERATOR: CALCIUM CHLORIDE	l	1170
			NF-6	NF-6	l	40

TOTAL CONSUMPTION OF CEMENT ADDITIVES ON WELL 30/9-19 A

Section	Cement/Additive	Unit	Total Amount Used
26"	CaCl2 / ACCELERATOR: CALCIUM CHLORIDE	l	1170.00
	NF-6	l	40.00
17 1/2"	NF-6	l	30.00
	RETARDER: HR-4L, LIQUID	l	80.00
	DISPERSANT: CFR-3 LIQUID	l	40.00
12 1/4"	RETARDER: SCR-100	kg	830.00
	SPACER 500	l	272.00
	NF-5	l	20.00
	DISPERSANT: CFR-3 LIQUID	l	1470.00
	EDP-C469-91	l	1800.00
	NF-6	l	68.00
	FLUID LOSS ADDITIVE: HALAD-600	l	1800.00
8 1/2"	DISPERSANT: CFR-3 LIQUID	l	280.00
	EDP-C469-91	l	1580.00
	FLUID LOSS ADDITIVE: HALAD-600	l	1950.00
	NF-6	l	65.00
	RETARDER: SCR-100L	l	850.00

DAILY MUD PROPERTIES:RHEOLOGY PARAMETERS FOR WELL 30/9-19 A PO: 1

Hole section : 12 1/4" **WATER BASED SYSTEM**

Date	Depth [m]		Mud Type	Funnel Visc	Dens	Mudtmp Out	Fann Readings								Rheo Test	PV	YP	Gel0	Gel10
	MD	TVD		[sec]	[sg]	[DegC]	600	300	200	100	60	30	6	3	[DegC]	[mPas]	[Pa]	[Pa]	[Pa]
1998-10-24 20:00	2834	2810	ANCO 2000	57.0	1.31		54	40	34	26	0	0	10	8	50.0	14.0	13.0	4.0	5.0
1998-10-25 14:00	2834	2810	ANCO 2000	57.0	1.31		52	39	32	24	0	0	10	8	50.0	13.0	13.0	5.0	6.0

Hole section : 17 1/2" **WATER BASED SYSTEM**

Date	Depth [m]		Mud Type	Funnel Visc	Dens	Mudtmp Out	Fann Readings								Rheo Test	PV	YP	Gel0	Gel10
	MD	TVD		[sec]	[sg]	[DegC]	600	300	200	100	60	30	6	3	[DegC]	[mPas]	[Pa]	[Pa]	[Pa]
1998-10-26 23:00	2318	2318	ANCO 2000	75.0	1.31		52	39	32	24	0	0	10	8	50.0	13.0	13.0	5.0	6.0
1998-10-27 19:30	2318	2318	ANCO 2000	52.0	1.31		51	38	31	24	0	0	10	8	50.0	13.0	12.5	5.0	6.0

Hole section : 12 1/4" **WATER BASED SYSTEM**

Date	Depth [m]		Mud Type	Funnel Visc	Dens	Mudtmp Out	Fann Readings								Rheo Test	PV	YP	Gel0	Gel10
	MD	TVD		[sec]	[sg]	[DegC]	600	300	200	100	60	30	6	3	[DegC]	[mPas]	[Pa]	[Pa]	[Pa]
1998-10-28 21:00	2372	2372	ANCO 2000	65.0	1.30		75	55	47	35	0	0	13	10	50.0	20.0	17.5	6.0	10.0
1998-10-29 21:00	2372	2372	ANCO 2000	79.0	1.30		78	57	49	35	0	0	13	11	50.0	21.0	18.0	7.0	15.0
1998-10-30 21:00	2349	2349	ANCO 2000	72.0	1.30		64	46	39	29	0	0	10	9	50.0	18.0	14.0	4.5	7.0
1998-10-31 21:30	2418	2417	ANCO 2000	59.0	1.30		78	58	50	39	0	0	16	14	50.0	20.0	19.0	7.5	10.0
1998-11-01 17:30	2427	2426	ANCO 2000		1.30		85	65	56	44	0	0	17	15	50.0	20.0	22.5	8.0	11.0
1998-11-02	2468	2467	ANCO 2000	62.0	1.30		78	59	50	39	0	0	15	13		19.0	20.0	8.0	11.0
1998-11-03	2536	2534	ANCO 2000	62.0	1.30		78	60	51	40	0	0	15	14	50.0	18.0	21.0	8.5	10.0
1998-11-04 22:00	2752	2738	ANCO 2000	55.0	1.30		81	62	53	41	0	0	16	14	50.0	19.0	21.5	8.0	10.0
1998-11-05 22:00	2860	2832	ANCO 2000	50.0	1.30		80	61	53	42	0	0	17	15	50.0	19.0	21.0	8.5	10.0
1998-11-06 21:00	2960	2916	ANCO 2000	55.0	1.30		81	62	53	42	0	0	16	14	50.0	19.0	21.5	8.0	10.5
1998-11-07 21:00	3075	3014	ANCO 2000	58.0	1.30		80	60	51	40	0	0	16	15	50.0	20.0	20.0	8.5	10.5
1998-11-08 20:00	3159	3085	ANCO 2000	53.0	1.30		78	59	48	35	0	0	15	13	50.0	19.0	20.0	8.0	10.0
1998-11-09 22:00	3197	3116	ANCO 2000	58.0	1.30		76	58	49	41	0	0	15	13	50.0	18.0	20.0	7.0	9.0
1998-11-10 15:00	3197	3116	ANCO 2000	62.0	1.30		76	58	49	41	0	0	15	13	50.0	18.0	20.0	7.0	9.0
1998-11-11 21:00	3197	3116	ANCO 2000	61.0	1.30		76	57	49	41	0	0	15	13	50.0	19.0	19.0	7.0	10.0
1998-11-12 20:00	3197	3116	ANCO 2000	61.0	1.30		76	57	49	41	0	0	15	13	50.0	19.0	19.0	7.0	10.0
1998-11-13	3197	3116	ANCO 2000	63.0	1.30		74	56	49	40	0	0	14	12	50.0	18.0	19.0	7.0	9.0

DAILY MUD PROPERTIES:RHEOLOGY PARAMETERS FOR WELL 30/9-19 A PO: 1

Hole section : 8 1/2" **WATER BASED SYSTEM**

Date	Depth [m]		Mud Type	Funnel Visc	Dens	Mudtmp Out	Fann Readings								Rheo Test	PV	YP	Gel0	Gel10
	MD	TVD		[sec]	[sg]	[DegC]	600	300	200	100	60	30	6	3	[DegC]	[mPas]	[Pa]	[Pa]	[Pa]
1998-11-14 21:00	3300	3200	ANCO 2000	63.0	1.30		53	39	31	22	0	0	12	10	50.0	14.0	12.5	4.0	5.0
1998-11-15 23:00	3342	3234	ANCO 2000	49.0	1.30		56	41	32	21	0	0	12	10	50.0	15.0	13.0	4.0	5.0
1998-11-16 23:45	3342	3234	ANCO 2000	54.0	1.30		54	40	32	23	0	0	11	9	50.0	14.0	13.0	5.0	6.0
1998-11-17 21:45	3743	3600	ANCO 2000	80.0	1.30		76	56	49	37	0	0	13	10	50.0	20.0	18.0	6.0	8.5
1998-11-18 19:30	3775	3632	ANCO 2000	66.0	1.30		84	61	52	38	0	0	13	11	50.0	23.0	19.0	5.5	8.0
1998-11-19 16:00	3775	3632	ANCO 2000	63.0	1.30		83	61	52	38	0	0	13	11	50.0	22.0	19.5	5.5	8.5
1998-11-20 19:30	3775	3632	ANCO 2000	70.0	1.30		82	60	51	38	0	0	13	10	50.0	22.0	19.0	5.5	8.0
1998-11-21 13:15	3775	3632	ANCO 2000	69.0	1.30		82	61	51	38	0	0	13	10	50.0	21.0	20.0	5.5	8.0
1998-11-22 21:30	3775	3632	ANCO 2000	75.0	1.30		81	60	50	37	0	0	13	10	50.0	21.0	19.5	5.5	8.0
1998-11-23 20:00	3775	3632	ANCO 2000		1.30		80	59	49	36	0	0	12	10	50.0	21.0	19.0	5.0	7.5
1998-11-24 22:30	3775	3632	ANCO 2000	71.0	1.30		80	59	50	37	0	0	13	10	50.0	21.0	19.0	5.5	8.0
1998-11-25 21:00	3775	3632	ANCO 2000	78.0	1.30		85	64	53	41	0	0	14	12	50.0	21.0	21.5	7.0	9.0
1998-11-26 22:30	3775	3632	ANCO 2000	75.0	1.30		82	61	50	39	0	0	13	11	50.0	21.0	20.0	6.0	8.0
1998-11-27 20:30	3775	3632	ANCO 2000	64.0	1.30		82	61	52	39	0	0	14	11	50.0	21.0	20.0	5.5	7.5
1998-11-28 20:00	3775	3632	ANCO 2000	70.0	1.30		84	63	54	41	0	0	14	12	50.0	21.0	21.0	6.0	8.0
1998-11-29 19:30	3775	3632	ANCO 2000	68.0	1.30		82	61	52	39	0	0	13	11	50.0	21.0	20.0	6.0	8.0
1998-11-30 20:00	3775	3632	ANCO 2000	67.0	1.30		81	60	51	38	0	0	12	10	50.0	21.0	19.5	6.0	8.0
1998-12-01	3775	3632	GLYDRIL	65.0	1.30		80	59	50	38	0	0	12	10	50.0	21.0	19.0	6.0	8.0
1998-12-02	3775	3632	GLYDRIL	65.0	1.30		79	58	49	38	0	0		10	50.0	21.0	18.5	5.5	7.5
1998-12-03	3775	3632	GLYDRIL	65.0	1.30		80	59	50	39	0	0	11	9	50.0	21.0	19.0	5.5	7.5
1998-12-04 23:59	3775	3632	GLYDRIL	63.0	1.30		78	58	48	38	0	0	10	9	50.0	20.0	19.0	5.0	7.0
1998-12-05	3775	3632	GLYDRIL	61.0	1.30		76	57	46	37	0	0	9	8	50.0	19.0	19.0	5.0	7.0
1998-12-06 23:59	3775	3632	GLYDRIL	61.0	1.30		76	57	46	37	0	0	9	8	50.0	19.0	19.0	5.0	7.0
1998-12-07 22:00	3775	3632	GLYDRIL	58.0	1.30		75	55	44	36	0	0	8	7	50.0	20.0	17.5	5.0	7.0
1998-12-08 04:00	3775	3632	GLYDRIL	60.0	1.30		70	52	44	34	0	0	12	10	50.0	18.0	17.0	6.0	8.0
1998-12-09 10:00	3775	3632	GLYDRIL	59.0	1.30		71	53	42	33	0	0	12	10	50.0	18.0	17.5	6.0	8.0
1998-12-10 11:00	3775	3632	GLYDRIL	61.0	1.30		69	51	40	31	0	0	11	9	50.0	18.0	16.5	6.0	8.0
1998-12-11 15:00	3775	3632	GLYDRIL	58.0	1.30		64	47	36	27	0	0	10	8	50.0	15.0	15.0	5.0	7.0
1998-12-12 15:00	3775	3632	GLYDRIL	59.0	1.30		64	47	37	26	0	0	10	8	50.0	17.0	15.0	5.0	7.0
1998-12-13 15:00	3775	3632	GLYDRIL	59.0	1.30		64	47	37	26	0	0	10	8	50.0	17.0	15.0	5.0	7.0

DAILY MUD PROPERTIES:RHEOLOGY PARAMETERS FOR WELL 30/9-19 A PO: 1

Hole section : 26" **WATER BASED SYSTEM**

Date	Depth [m]		Mud Type	Funnel Visc	Dens	Mudtmp Out	Fann Readings								Rheo Test	PV	YP	Gel0	Gel10
	MD	TVD		[sec]	[sg]	[DegC]	600	300	200	100	60	30	6	3	[DegC]	[mPas]	[Pa]	[Pa]	[Pa]
1998-12-14 15:00	400	400	GLYDRIL	62.0	1.30		63	47	37	26	0	0	10	8	50.0	16.0	15.5	5.0	7.0

Hole section : 8 1/2" **WATER BASED SYSTEM**

Date	Depth [m]		Mud Type	Funnel Visc	Dens	Mudtmp Out	Fann Readings								Rheo Test	PV	YP	Gel0	Gel10
	MD	TVD		[sec]	[sg]	[DegC]	600	300	200	100	60	30	6	3	[DegC]	[mPas]	[Pa]	[Pa]	[Pa]
1998-12-15 15:00	3775	3632	GLYDRIL	62.0	1.34		63	47	37	26	0	0	10	8	50.0	16.0	15.5	5.0	7.0

DAILY MUD PROPERTIES : OTHER PARAMETERS FOR WELL 30/9-19 A PO: 1

Hole section : 12 1/4" **WATER BASED SYSTEM**

Date	Depth [m] MD	Depth [m] TVD	Mud Type	Dens [sg]	Filtrate API [ml]	Filtrate HPHT [ml]	Filtcake API [mm]	Filtcake HPHT [mm]	HPHT Press/Temp [bar/DegC]	pH	Alcalinity Pm [ml]	Alcalinity Pf [ml]	Alcalinity Mf [ml]	Inhib Chem [Kg/m3]	K+ [mg/l]	CL- [mg/l]	Ca++ [mg/l]	Mg++ [mg/l]	Tot hard [mg/l]	Percentage Solid [%]	Percentage Oil [%]	Percentage Sand [%]	CEC [Kg/m3]	ASG [sg]	LGS [Kg/m3]
1998-10-24 20:00	2834	2810	ANCO 2000	1.31	2.5		1		/	8.1		0.0	0.9			74000	440		790	13.0		0.3			
1998-10-25 14:00	2834	2810	ANCO 2000	1.31	2.4		1		/	8.4		0.0	0.8			65500	410		630	13.0		0.3			

Hole section : 17 1/2" **WATER BASED SYSTEM**

Date	Depth [m] MD	Depth [m] TVD	Mud Type	Dens [sg]	Filtrate API [ml]	Filtrate HPHT [ml]	Filtcake API [mm]	Filtcake HPHT [mm]	HPHT Press/Temp [bar/DegC]	pH	Alcalinity Pm [ml]	Alcalinity Pf [ml]	Alcalinity Mf [ml]	Inhib Chem [Kg/m3]	K+ [mg/l]	CL- [mg/l]	Ca++ [mg/l]	Mg++ [mg/l]	Tot hard [mg/l]	Percentage Solid [%]	Percentage Oil [%]	Percentage Sand [%]	CEC [Kg/m3]	ASG [sg]	LGS [Kg/m3]
1998-10-26 23:00	2318	2318	ANCO 2000	1.31	2.4		1		/	8.5		0.0	1.3			75000	410		630	13.0		0.3			
1998-10-27 19:30	2318	2318	ANCO 2000	1.31	2.3	12.0	1	1	/	6.9			0.0			2	400		620	13.0		0.3			

Hole section : 12 1/4" **WATER BASED SYSTEM**

Date	Depth [m] MD	Depth [m] TVD	Mud Type	Dens [sg]	Filtrate API [ml]	Filtrate HPHT [ml]	Filtcake API [mm]	Filtcake HPHT [mm]	HPHT Press/Temp [bar/DegC]	pH	Alcalinity Pm [ml]	Alcalinity Pf [ml]	Alcalinity Mf [ml]	Inhib Chem [Kg/m3]	K+ [mg/l]	CL- [mg/l]	Ca++ [mg/l]	Mg++ [mg/l]	Tot hard [mg/l]	Percentage Solid [%]	Percentage Oil [%]	Percentage Sand [%]	CEC [Kg/m3]	ASG [sg]	LGS [Kg/m3]
1998-10-28 21:00	2372	2372	ANCO 2000	1.30	2.5	12.2	1	1	/	10.7		0.1	2.2			80000	340		464	13.5		0.3			
1998-10-29 21:00	2372	2372	ANCO 2000	1.30	2.1	12.8	1	1	/	7.9		0.2	2.0			75000	430		430	13.5		0.4			
1998-10-30 21:00	2349	2349	ANCO 2000	1.30	3.0	12.0	1	1	/	9.2		0.1	3.8			74000	404		424	12.8		0.3			
1998-10-31 21:30	2418	2417	ANCO 2000	1.30	2.8	13.6	1	1	500 / 110	9.2		0.1	2.8	3		75000	440		620	13.5		0.3			123
1998-11-01 17:30	2427	2426	ANCO 2000	1.30	2.9	13.2	1	1	500 / 110	8.6		0.1	4.1	135		74500	370		400	13.3		0.3			113
1998-11-02	2468	2467	ANCO 2000	1.30	3.1	13.1	1	1	/	9.0		0.1	3.8			77000	400		460	13.0		0.3			93
1998-11-03	2536	2534	ANCO 2000	1.30	3.2		1		/	9.1		0.1	3.1			73000	400		480	12.9		0.3			93
1998-11-04 22:00	2752	2738	ANCO 2000	1.30	3.0		1		/	8.6		0.0	2.8			74600	480		560	13.2		0.3			107
1998-11-05 22:00	2860	2832	ANCO 2000	1.30	2.7	1.0			/	8.5		0.0	2.5			77500	425		540	12.7		0.2			77
1998-11-06 21:00	2960	2916	ANCO 2000	1.30	2.8		1		/	8.4		0.0	2.6			80500	425		540	12.8		0.2			78
1998-11-07 21:00	3075	3014	ANCO 2000	1.30	3.2		1		/	8.5		0.0	2.5			78600	405		530	13.0		0.2			91
1998-11-08 20:00	3159	3085	ANCO 2000	1.30	3.2		1		/	8.3		0.0	2.3			78500	400		510	13.1		0.2			97
1998-11-09 22:00	3197	3116	ANCO 2000	1.30	2.8		1		/	8.4		0.0	2.2			79400	390		465	13.0		0.2			90
1998-11-10 15:00	3197	3116	ANCO 2000	1.30	3.0		1		/	8.4		0.0	2.2			80500	400		470	13.0					89
1998-11-11 21:00	3197	3116	ANCO 2000	1.30	3.2		1		/	8.4		0.0	2.2			80500	400		470	13.0					89
1998-11-12 20:00	3197	3116	ANCO 2000	1.30	3.2		1		/	8.4		0.0	2.2			79500	400		470	13.0					90
1998-11-13	3197	3116	ANCO 2000	1.30	2.1		1		/	8.4		0.0	0.7			78000	300		320	13.0					92

DAILY MUD PROPERTIES : OTHER PARAMETERS FOR WELL 30/9-19 A PO: 1

Hole section : 8 1/2" **WATER BASED SYSTEM**

Date	Depth [m] MD	Depth [m] TVD	Mud Type	Dens [sg]	Filtrate API [ml]	Filtrate HPHT [ml]	Filtcake API [mm]	Filtcake HPHT [mm]	HPHT Press/Temp [bar/DegC]	pH	Alcalinity Pm [ml]	Alcalinity Pf [ml]	Alcalinity Mf [ml]	Inhib Chem [Kg/m3]	K+ [mg/l]	CL- [mg/l]	Ca++ [mg/l]	Mg++ [mg/l]	Tot hard [mg/l]	Percentage Solid [%]	Percentage Oil [%]	Percentage Sand [%]	CEC [Kg/m3]	ASG [sg]	LGS [Kg/m3]
1998-11-14 21:00	3300	3200	ANCO 2000	1.30	1.6		1		/	8.7		0.1	0.2			76000	260		280	13.0		0.0			95
1998-11-15 23:00	3342	3234	ANCO 2000	1.30	1.6		1		/	8.5		0.1	0.1			77000	280		320	13.0		0.0			93
1998-11-16 23:45	3342	3234	ANCO 2000	1.30	2.1	10.2	1	1	/	8.4		0.0	0.2			77000	280	20	300	13.0		0.3			93
1998-11-17 21:45	3743	3600	ANCO 2000	1.30	2.1		1		/	8.0		0.0	0.4			75000	280		340	13.0		0.2			96
1998-11-18 19:30	3775	3632	ANCO 2000	1.30	2.1		1		/	8.6		0.1	0.4	130		75000	160		300	13.0		0.3			96
1998-11-19 16:00	3775	3632	ANCO 2000	1.30	2.1		1		/	8.6		0.1	0.4			75000	160		300	13.0		0.3			96
1998-11-20 19:30	3775	3632	ANCO 2000	1.30	2.2		1		/	8.5		0.1	0.5			74000	180		300	13.0		0.3			97
1998-11-21 13:15	3775	3632	ANCO 2000	1.30	2.2		1		/	8.5		0.1	0.4			75000	180		300	13.0		0.3			96
1998-11-22 21:30	3775	3632	ANCO 2000	1.30	2.2		1		/	8.4		0.0	0.4			75000	160		300	13.0		0.3			96
1998-11-23 20:00	3775	3632	ANCO 2000	1.30	2.3		1		/	8.3		0.0	0.5			75000	120		240	13.0		0.3			96
1998-11-24 22:30	3775	3632	ANCO 2000	1.30	2.6		1		/	8.6		0.0	0.7			75000	80		160	13.0		0.3			96
1998-11-25 21:00	3775	3632	ANCO 2000	1.30	2.5		1		/	8.6		0.0	0.6			74800	75		150	13.0		0.2			96
1998-11-26 22:30	3775	3632	ANCO 2000	1.30	2.5		1		/	8.5		0.0	0.6			75100	85		165	13.0		0.2			96
1998-11-27 20:30	3775	3632	ANCO 2000	1.30	2.8		1		/	8.5		0.0	0.5			75000	90		190	12.6		0.1			77
1998-11-28 20:00	3775	3632	ANCO 2000	1.30	2.8		1		/	8.5		0.0	0.5			75000	85		180	12.5		0.1			72
1998-11-29 19:30	3775	3632	ANCO 2000	1.30	2.9		1		/	8.5		0.0	0.5			75000	85		180	12.5		0.1			72
1998-11-30 20:00	3775	3632	ANCO 2000	1.30	3.0		1		/	8.5		0.0	0.5			75000	80		175	12.5		0.1			72
1998-12-01	3775	3632	GLYDRIL	1.30	3.0		1		/			0.0	0.4						160	12.5		0.1			
1998-12-02	3775	3632	GLYDRIL	1.30	3.0		1		/			0.0	0.4						160	12.5		0.1			
1998-12-03	3775	3632	GLYDRIL	1.30	3.0		1		/	8.4		0.0	0.4						160	12.5		0.1			
1998-12-04 23:59	3775	3632	GLYDRIL	1.30	3.0		1		/	8.4		0.0	0.4						175	12.5		0.1			
1998-12-05	3775	3632	GLYDRIL	1.30	3.1		1		/	8.4		0.0	0.3						170	12.5		0.1			
1998-12-06 23:59	3775	3632	GLYDRIL	1.30	3.1		1		/	8.3		0.0	0.3						170	12.5		0.1			
1998-12-07 22:00	3775	3632	GLYDRIL	1.30	3.2		1		500 / 110	8.3		0.0	0.3	128		74500	65		170	8.7		0.1			83
1998-12-08 04:00	3775	3632	GLYDRIL	1.30	3.3		1		500 / 110	8.6		0.0	0.2			74500	75		185	12.7		0.1			83
1998-12-09 10:00	3775	3632	GLYDRIL	1.30	3.3		1		500 / 110	8.6		0.0	0.2			74500	70		185	12.7		0.1			83
1998-12-10 11:00	3775	3632	GLYDRIL	1.30	3.4		1		500 / 110	9.8		0.0	0.2			74000	320		360	12.7		0.1			84
1998-12-11 15:00	3775	3632	GLYDRIL	1.30	2.8		1		500 / 110	9.9		0.6	1.1			73000	120		160	12.7		0.1			85
1998-12-12 15:00	3775	3632	GLYDRIL	1.30	2.8		1		10 / 110	9.9		0.6	1.1			73000	230			12.7	0.0	0.1			85
1998-12-13 15:00	3775	3632	GLYDRIL	1.30	2.8		3		34 / 110	9.2		0.3	0.6			73500	120		160	12.7		0.1			84

DAILY MUD PROPERTIES : OTHER PARAMETERS FOR WELL 30/9-19 A PO: 1

Hole section : 26" **WATER BASED SYSTEM**

Date	Depth [m] MD	Depth [m] TVD	Mud Type	Dens [sg]	Filtrate API [ml]	Filtrate HPHT [ml]	Filtcake API [mm]	Filtcake HPHT [mm]	HPHT Press/Temp [bar/DegC]	pH	Alcalinity Pm [ml]	Alcalinity Pf [ml]	Alcalinity Mf [ml]	Inhib Chem [Kg/m3]	K+ [mg/l]	CL- [mg/l]	Ca++ [mg/l]	Mg++ [mg/l]	Tot hard [mg/l]	Percentage Solid [%]	Percentage Oil [%]	Percentage Sand [%]	CEC [Kg/m3]	ASG [sg]	LGS [Kg/m3]
1998-12-14 15:00	400	400	GLYDRIL	1.30	2.8		1		34 / 110	9.8		0.3	0.6	126		73500	135		170	12.7		0.1			19

Hole section : 8 1/2" **WATER BASED SYSTEM**

Date	Depth [m] MD	Depth [m] TVD	Mud Type	Dens [sg]	Filtrate API [ml]	Filtrate HPHT [ml]	Filtcake API [mm]	Filtcake HPHT [mm]	HPHT Press/Temp [bar/DegC]	pH	Alcalinity Pm [ml]	Alcalinity Pf [ml]	Alcalinity Mf [ml]	Inhib Chem [Kg/m3]	K+ [mg/l]	CL- [mg/l]	Ca++ [mg/l]	Mg++ [mg/l]	Tot hard [mg/l]	Percentage Solid [%]	Percentage Oil [%]	Percentage Sand [%]	CEC [Kg/m3]	ASG [sg]	LGS [Kg/m3]
1998-12-15 15:00	3775	3632	GLYDRIL	1.34	2.8		1		/	8.8		0.0	0.4			73500	135		170	15.0		0.1			139

TOTAL CONSUMPTION OF MUD ADDITIVES ON WELL 30/9-19 A

Section	Product/ Additive	Unit	Total Amount Used
12 1/4"	BARITE	kg	105000.00
	CELPOL ESL	kg	5425.00
	CITRIC ACID	kg	4175.00
	FLOWZAN	kg	2925.00
	GLYDRIL MC	l	9600.00
	KCL BRINE	l	219000.00
	KCL POWDER	kg	7000.00
	POTASSIUM CARBONATE	kg	175.00
	SODA ASH	kg	175.00
	SODIUM BICARBONATE	kg	4250.00
8 1/2"	BACL2	l	750.00
	BARITE	kg	150000.00
	CELPOL ESL	kg	9325.00
	CITRIC ACID	kg	725.00
	FLOWZAN	kg	3225.00
	KCL BRINE	l	318.00
	POTASSIUM CARBONATE	kg	850.00
	SODA ASH	kg	200.00
	SODIUM BICARBONATE	kg	850.00
)NDEFINEI	BARITE	kg	48000.00
	CITRIC ACID	kg	275.00
	FLOWZAN	kg	125.00
	KCL BRINE	l	13000.00
	SODIUM BICARBONATE	kg	75.00

Estimated Pore Pressure, Fracture, Overburden and Temperature Gradients

Pore Pressure

The pore pressure in well 30/9-19 is based on MWD resistivity log, MDT pressure readings, and DXC.

It is very difficult to calculate pore pressure in Hordaland Group when drilling with high overbalance and PDC bit. Lithological variations make it difficult to estimate pore pressure decrease in Rogaland Gp and pressure development over the boundary to Shetland Gp.

No shallow gas occurs in the upper sediments. Down to 1700m the pore pressure is normal and increases rapidly to max pore pressure 1.32 +/- 0.05 sg. The pore pressure stays constant down to top Rogaland and is evaluated to decrease to 1.10 sg at the top of Shetland Gp. The pore pressure follows a 1.10 sg trend down to a sandstone interval between 3070 - 3074 mTVD. The pore pressure is measured with MDT to 1.14 sg.

Results from MDT measurement, in the Brent Gp, show that the pressure in Tarbert 3 is 1.11 sg and decreasing to 1.07 in Tarbert 1. The gas gradient in Tarbert 2 is 0.025 bar/m, 0.016 bar/m in Tarbert 1, and the oil gradient in Tarbert 1 is 0.052 bar/m. An isolated sandbody in Tarbert 1, at 3255 mTVD, has a pore pressure of 1.22 sg. The pore pressure in Ness formation increases from 1.10 sg to 1.22 sg. The pore pressure in ORE formation is measured to 1.26 sg.

There are no indications of pressure alteration in Dunlin GP down to TD.

Formation Strength

Leak off tests were performed to 1.62 sg @ 1208m, 1.70 sg @ 2332m and 1.81 @ 2924.5m.

Fracture Gradient is adjusted to LOT values.

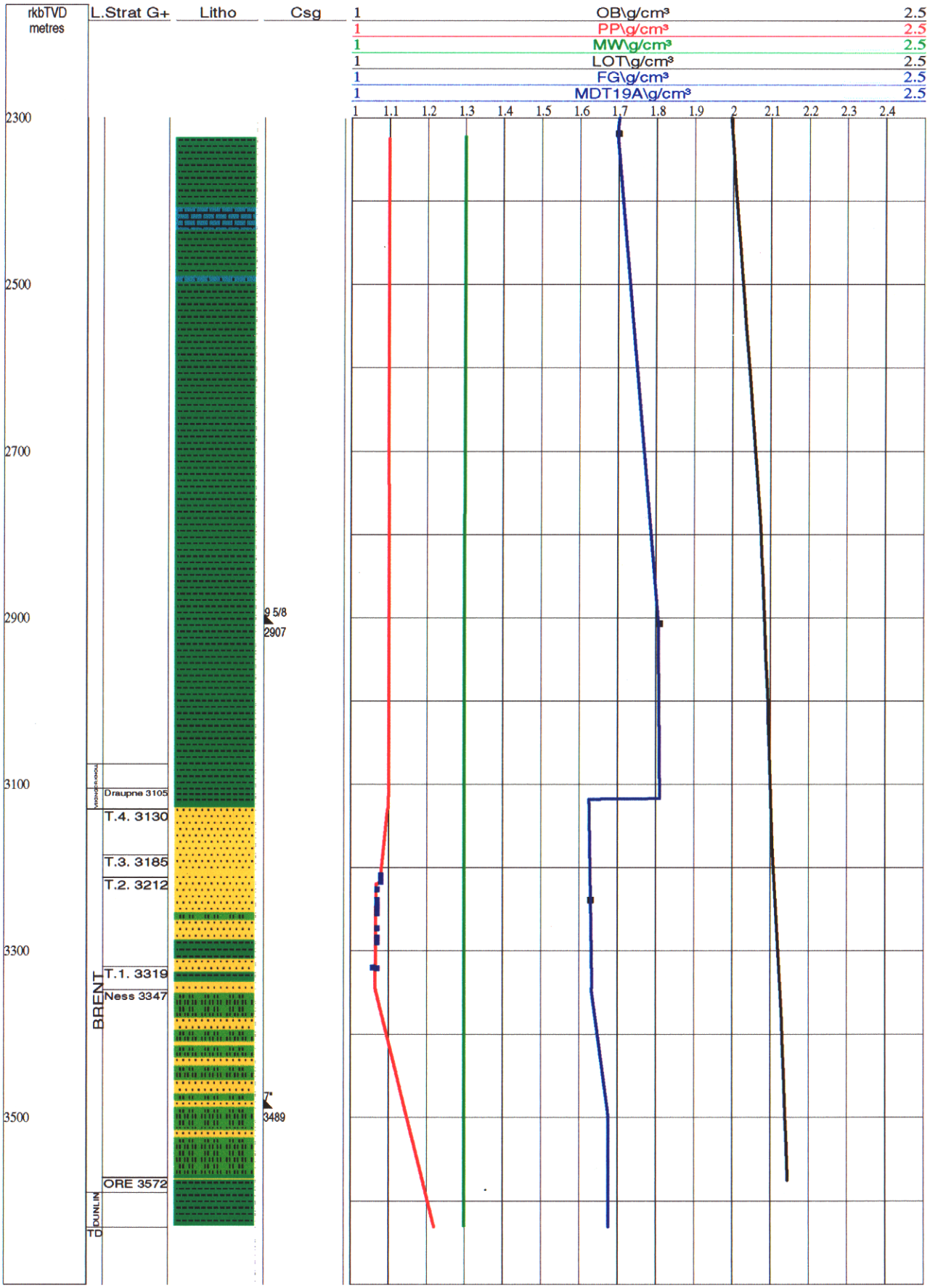
There were no hole problem in the well during drilling.

Overburden Gradient

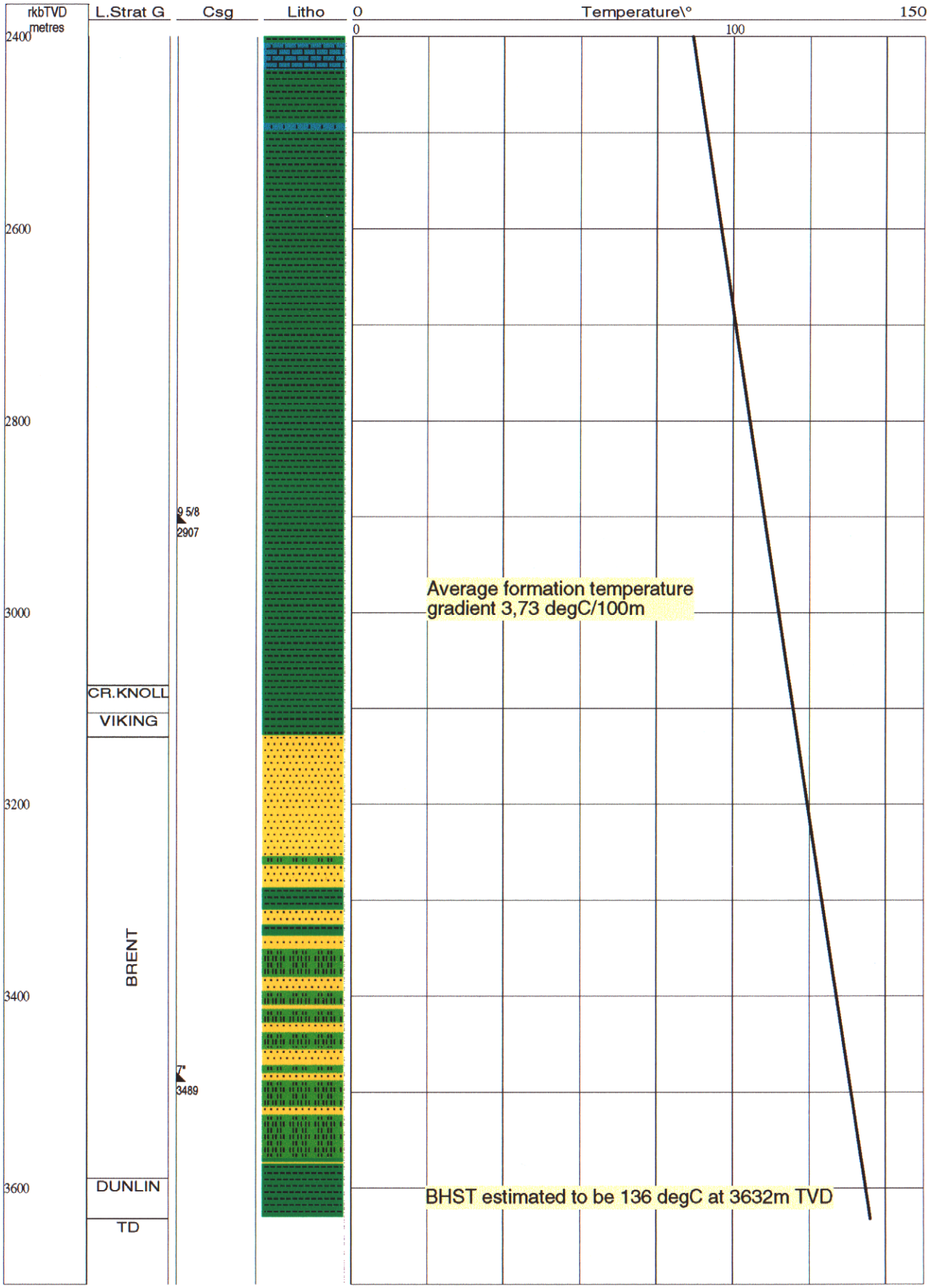
Overburden gradient is taken from prognosis in Drilling program due to absents of density log above reservoar.

Temperature Gradient

Bottom hole static temperature is taken from DST and measured to 121 deg C from the perforated interval 3242 - 3258 mTVD. The temperaure at TD, 3632 mTVD RKB, was estimated to 136 deg C with a gradient of 3.73 deg/100m.



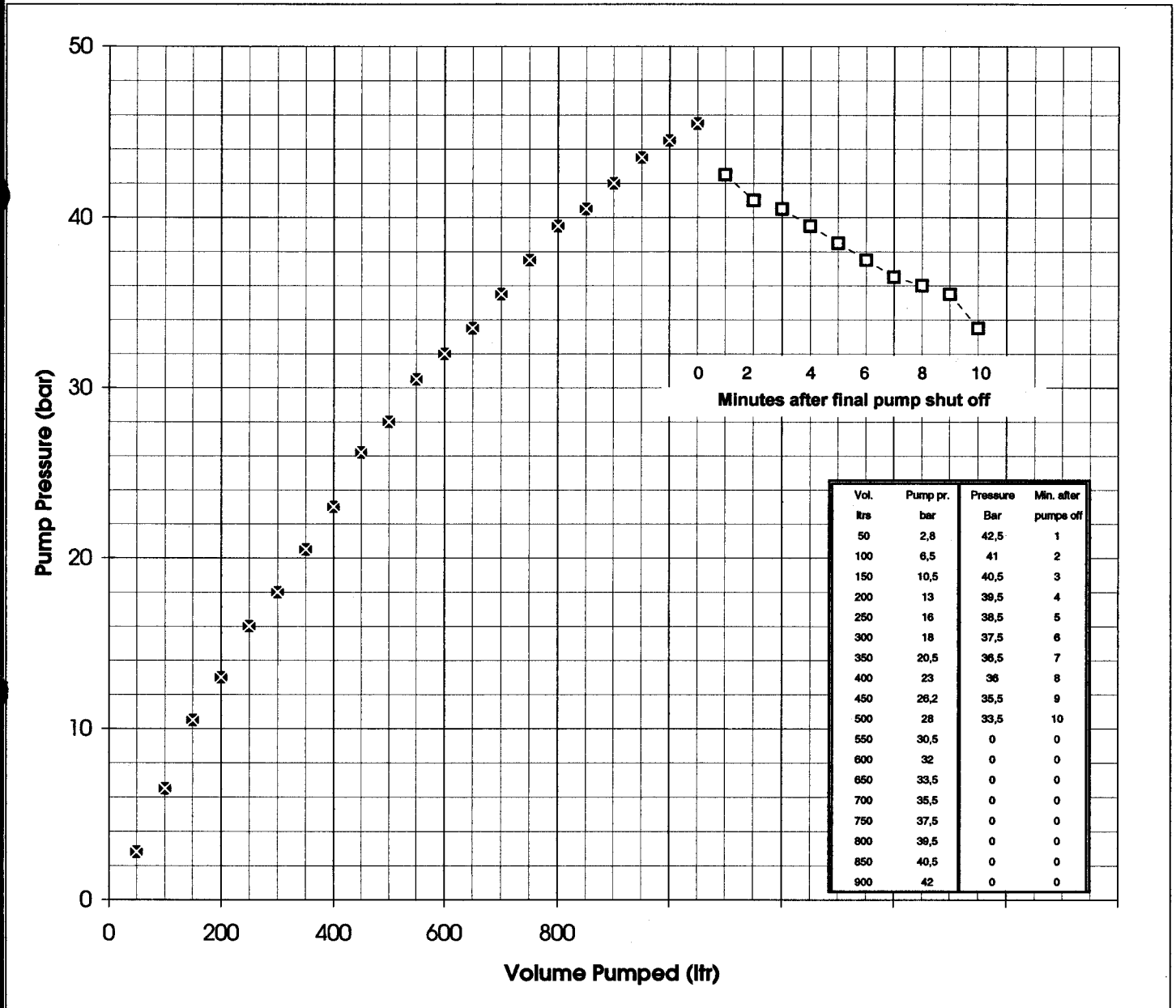
Estimated Pore pressure, Fracture and Overburden Gradient



Formation Temperature Gradient

B-52 A

Well	30/9-19		Test type - ELOT/LOT/FIT	LOT		Test date	20/9-98
Rig	West Delta	Airgap(m) 29	Water depth (m)	105,0	Csg OD (in)	20"	Hole angle (deg) 1,46
Csg Shoe (mMD/mTVD)	1198	1198	OH depth, (mMD/mTVD)	1208	1208	Lithology	Clst
Mud Properties	Dens (sg)	1,3	API WL(ml/30min)	PV (cp)		YP (Pa)	Gels (Pa)
Pump Rate (l/min)		80	Vol pumped (l.)		1050	Vol bled back (l.)	557
Leakoff Pressure (bar)		38	Max pressure (bar)		45,5	Propagation press. (bar)	
Test result (sg EMD)		1,62	Comments				

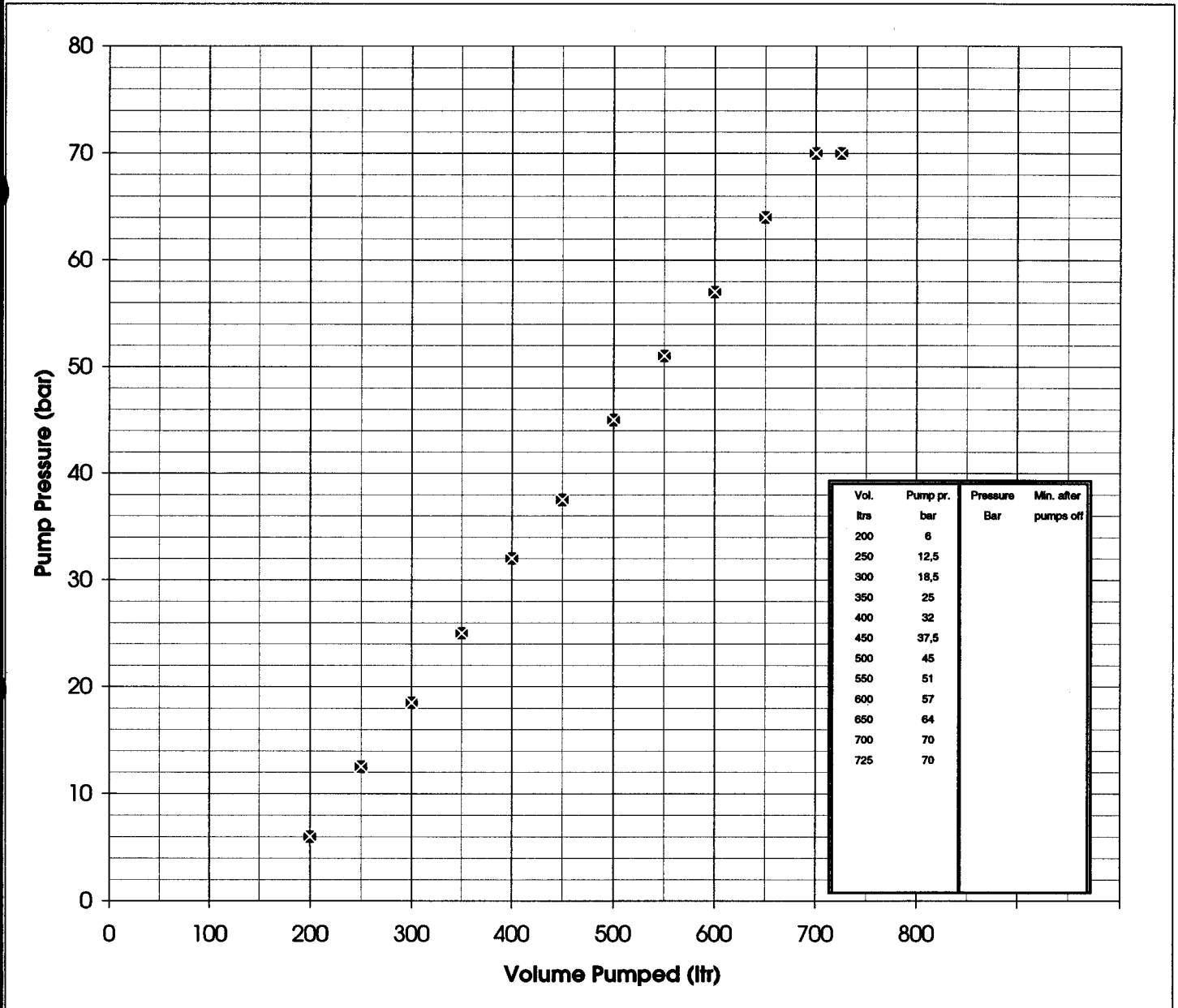


Vol. ltrs	Pump pr. bar	Pressure Bar	Min. after pumps off
50	2,8	42,5	1
100	6,5	41	2
150	10,5	40,5	3
200	13	39,5	4
250	16	38,5	5
300	18	37,5	6
350	20,5	36,5	7
400	23	36	8
450	26,2	35,5	9
500	28	33,5	10
550	30,5	0	0
600	32	0	0
650	33,5	0	0
700	35,5	0	0
750	37,5	0	0
800	39,5	0	0
850	40,5	0	0
900	42	0	0

Final Well Report 30/9-19	Fig. B-3 A	**Formation Strength Test Report**

B-52 B

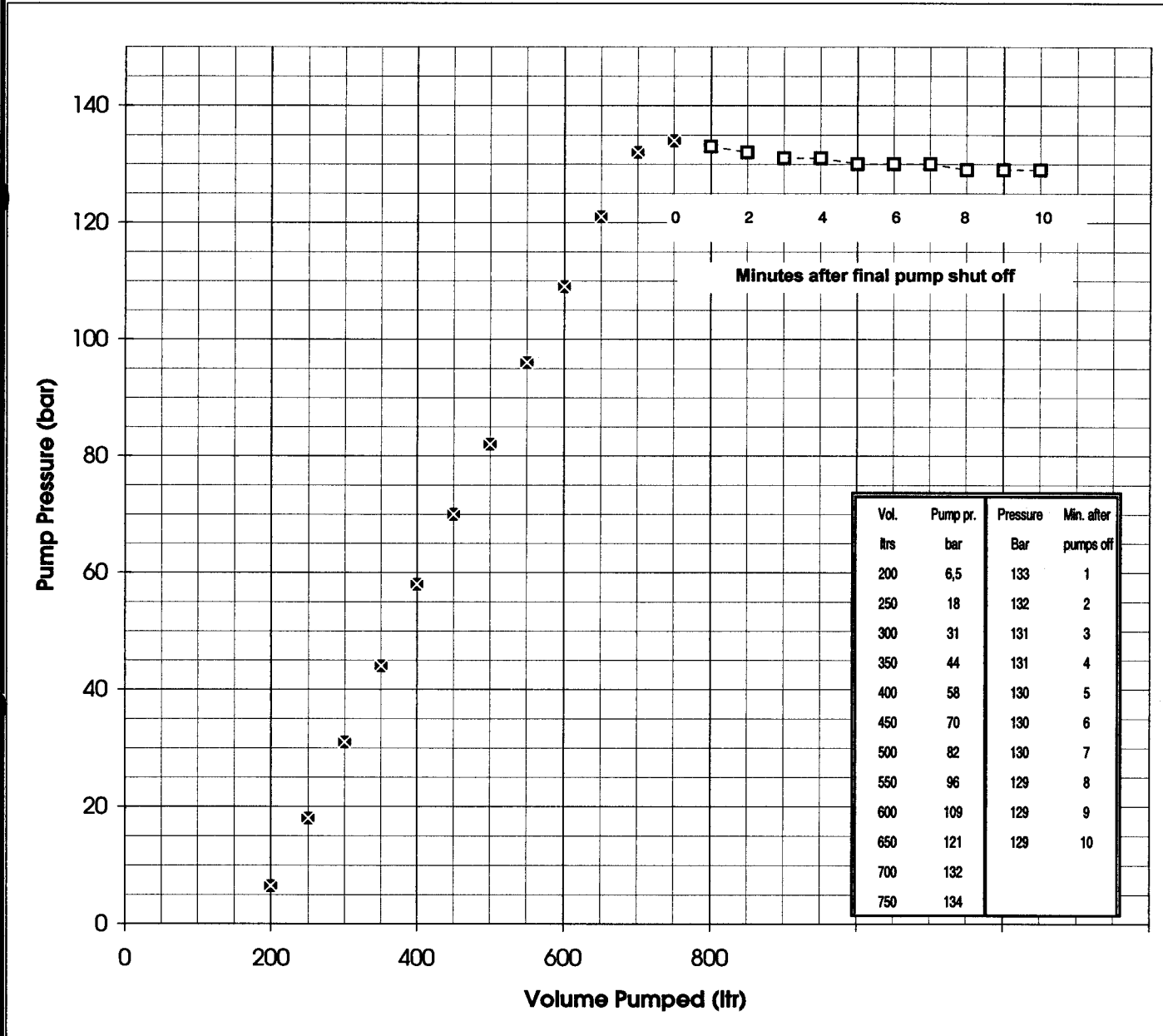
Well	30/9-19		Test type - ELOT/LOT/FIT	LOT		Test date	26/9-98
Rig	West Delta	Airgap(m) 29	Water depth (m)	105,0	Csg OD (in)	13 3/8"	Hole angle (deg) 1,46
Csg Shoe (mMD/mTVD)	2318	2318	OH depth, (mMD/mTVD)	2332	2332	Lithology	Clst
Mud Properties	Dens (sg)	1,4	API WL(ml/30min)	PV (cp)		YP (Pa)	Gels (Pa)
Pump Rate (l/min)	100		Vol pumped (l.)	700		Vol bled back (l.)	550
Leakoff Pressure (bar)	70		Max pressure (bar)	70		Propagation press. (bar)	
Test result (sg EMD)	1,71		Comments				



Final Well Report 30/9-19	Fig. B-3 B	Formation Strength Test Report

B-52 C

Well	30/9-19			Test type - ELOT/LOT/FIT	LOT	Test date	04/10-98
Rig	West Delta	Airgap(m)	29	Water depth (m)	105,0	Csg OD (in)	9 5/8"
Hole angle (deg)	2,9						
Csg Shoe (mMD/mTVD)	2907	2907		OH depth, (mMD/mTVD)	2925	2925	
Lithology	Clst						
Mud Properties	Dens (sg)	1,36		API WL(ml/30min)		PV (cp)	
YP (Pa)		Gels (Pa)					
Pump Rate (l/min)	50			Vol pumped (l.)	750		
Vol bled back (l.)	750						
Leakoff Pressure (bar)	130			Max pressure (bar)	134		
Propagation press. (bar)							
Test result (sg EMD)	1,82			Comments			



Vol. ltrs	Pump pr. bar	Pressure Bar	Min. after pumps off
200	6,5	133	1
250	18	132	2
300	31	131	3
350	44	131	4
400	58	130	5
450	70	130	6
500	82	130	7
550	96	129	8
600	109	129	9
650	121	129	10
700	132		
750	134		

Final Well Report 30/9-19	**Fig.** B-3 C	**Formation Strength Test Report**

1999-04-22

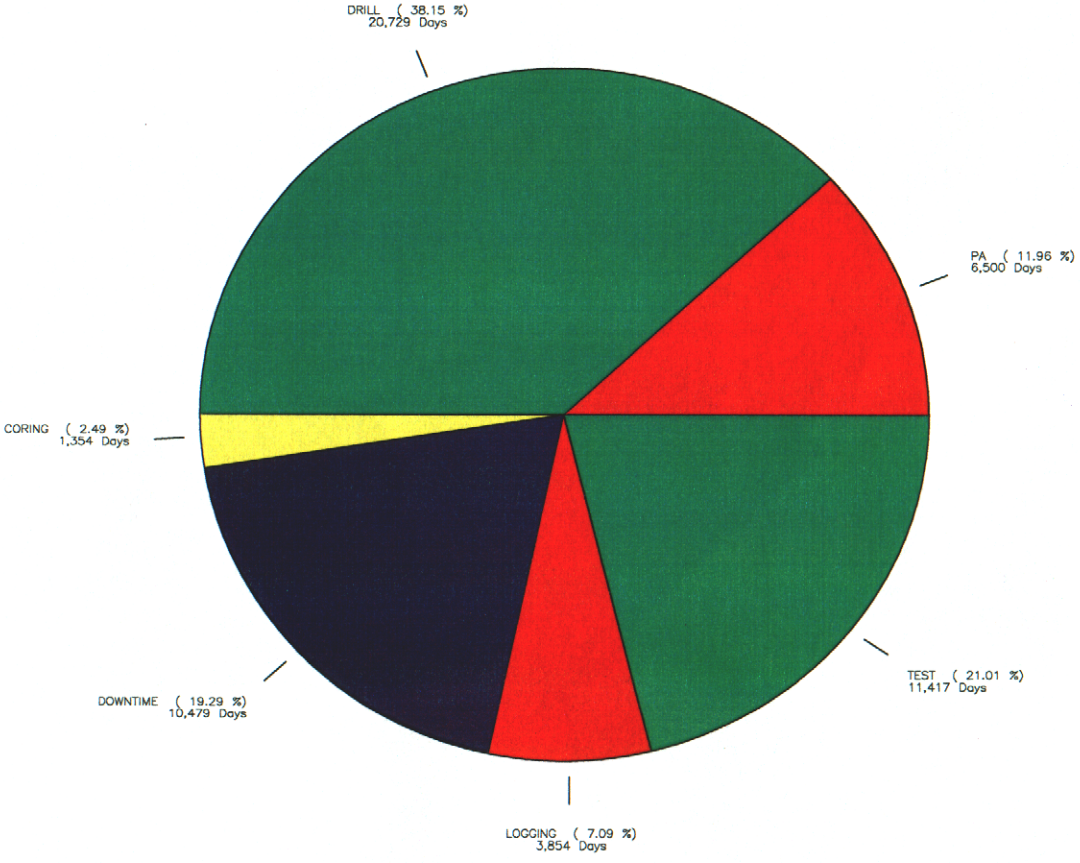


Figure 4		Time Distribution 30/9-19 A	**HYDRO**

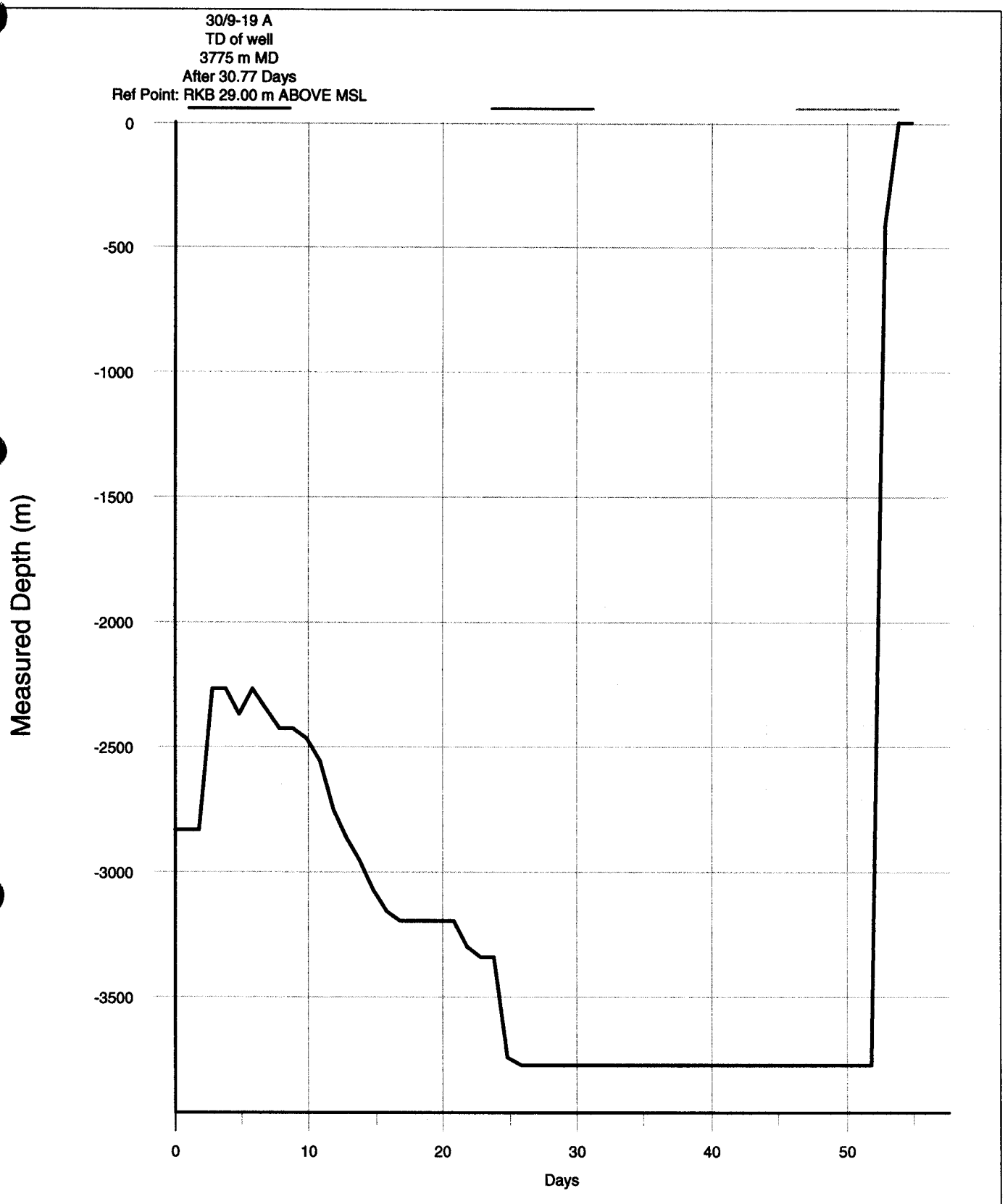


Figure 5		MD Drilling Curve	**HYDRO**

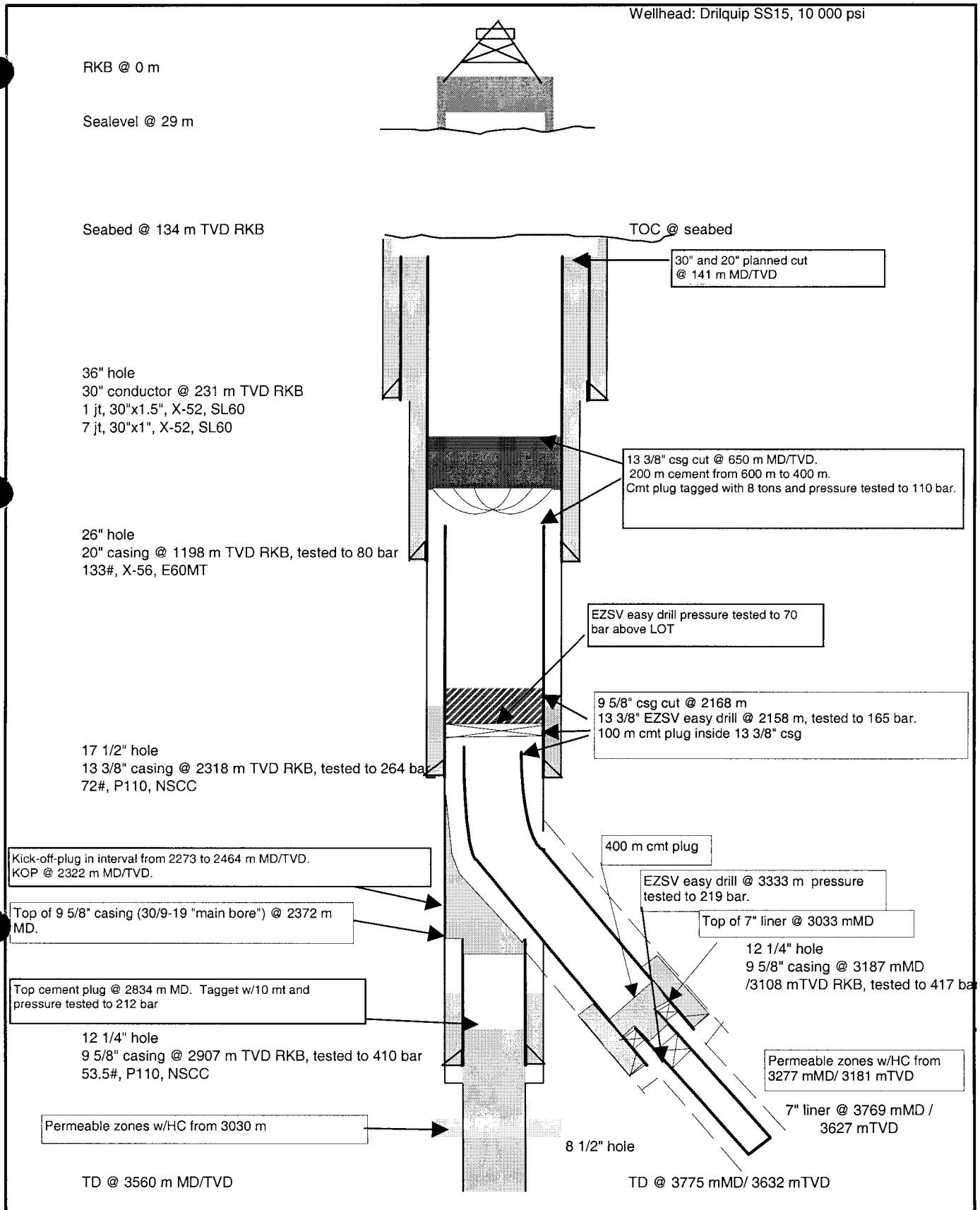
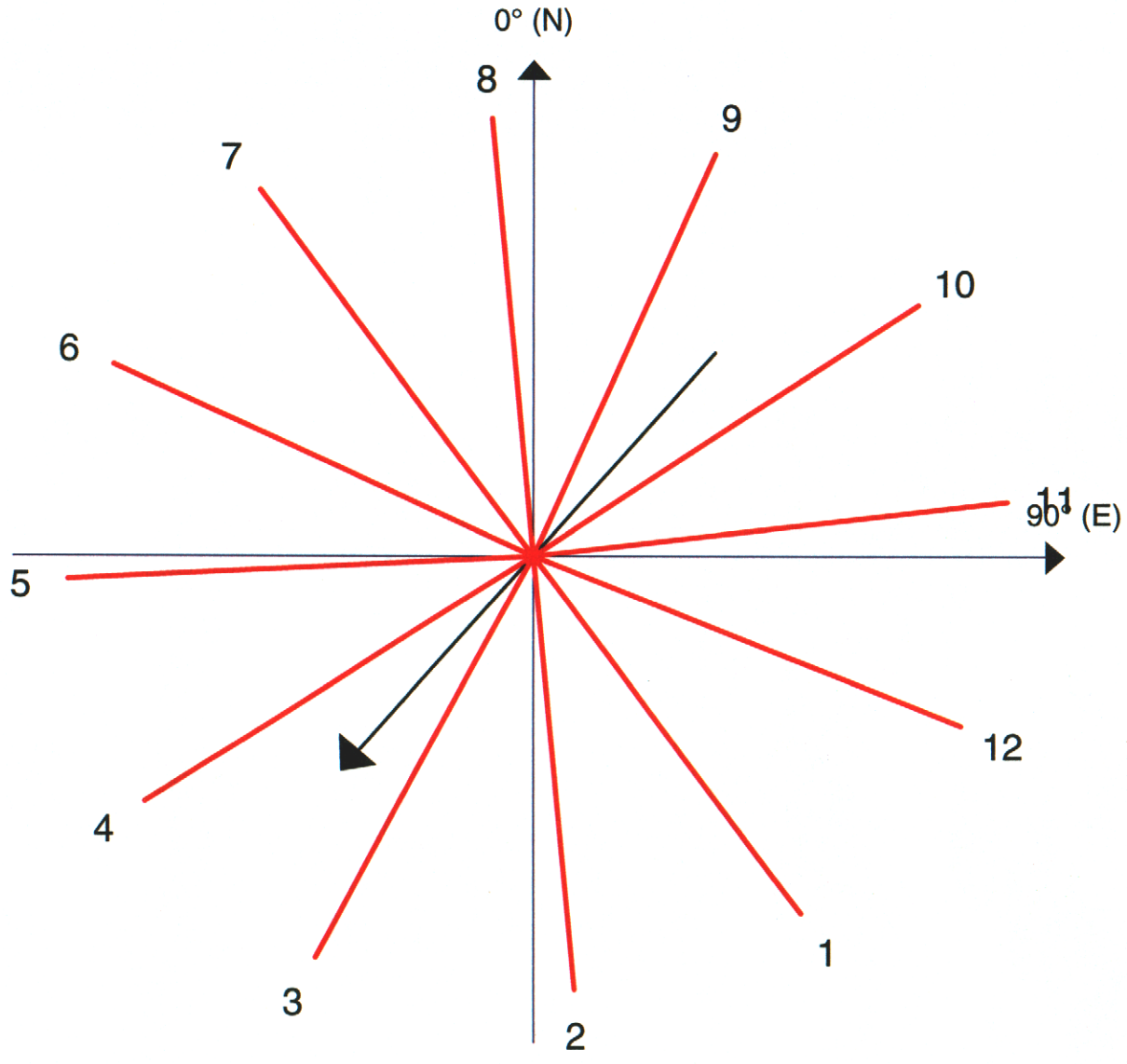


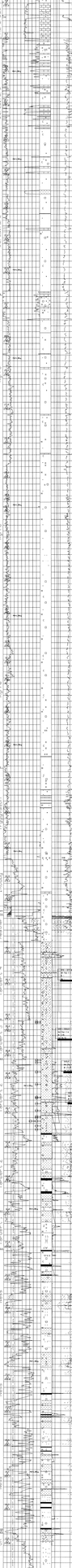
Figure 6	**Well Status** **After Abandonment**	**HYDRO**



RIGHEADING 220 DEG.

ANCHOR NO		DIRECTION (DEG.)		LENGTH (m)	
	1		145		1790
	2		175		1785
	3		207		1850
	4		236		1800
	5		267		1790
	6		296		1795
	7		325		1835
	8		355		1805
	9		23		1795
	10		55		1800
	11		83		1830
	12		113		1780

Figure 7		RIG ANCHORS WEST DELTA 30/9-19 A	**HYDRO**



Completion log

Scale: 1:500

Well: 30/9-19 A

Location map

Country:	NORWAY
Licence:	PL 079
Owners:	NORSK HYDRO
Field:	OSEBERG
Date on cost:	24.10.98
Date kicked off:	28.10.98
Reached Total Depth:	18.11.98
Completed:	06.12.98
Well Status:	P & A. as an oil and gas discovery
Rig:	West Delta
Contractor:	Smedvig
Mudlogging Company:	Geoservice
Geologists:	B. Kjellin/C.E. Dons/M.J. Henderson, B. Schønningsen/J.R. Eide
Prepared by:	B. Kjellin
Controlled by:	O. Rong
Date:	June, 1999

Coordinates: N 60° 27′ 35.38″ UTM: 6 702 819.9 mN
E 02° 41′ 38.94″ 483 176.9 mE

Elevation K B:	29 m	ED 50. UTM Zone 31. CM 03° E
Water Depth:	105 m MSL	
Total Depth (Driller):	3775 m	
Total Depth (Logger):	3778 m	
Formation at Total Depth:	DUNLIN GP	

Casing Records:

30"	at	231 m MD
20"	at	1198 m MD
13 3/8"	at	2318.5 m MD
9 5/8"	at	3187 m MD

Comments:

Drilled 9 7/8" pilot hole from 233 to 1202 m.
Opened 9 7/8" hole to 26" hole down to 1205 m
17 1/2" hole drilled 1205 - 2329 m
12 1/4" " " 2323 - 3197 m
8 1/2" " " 3197 - 3775 m

Logs Run

DSI/GR	USIT/CBL/VDL/GR/CCL/AMS	HALS/TLD/HGNS/GPIT/AMS	MDT/GR	CMR/GR	
3760 - 3170	3407 - 3037	3775 - 3150	3448 - 3278.5	3460 - 3275	

Legend

C Carbonaceous mat.
Chert
* Glauconite
M Mica
Pyrite
Macrofossils
Macrofossils frag.
Microfossils

Hydrocarbon Shows
- Oil stain
- Fluorescence
- Visible cut
- Fluorescence cut
- Gas shows

Casing Shoe

Deviation

Core interval

Side Wall Core (No recovery)

Two way time from velocity survey (depth m K.B.) e.g:
1732m
1.740 mSec

Perforated Interval

Cement

Plug

Interval

DST
- Trough casing
- Open hole
- Re-run
- RFT / FIT

2323 - 2407 m MD (2323.0 - 2407.2m TVD)

Clst: dk gry-olv blk, sft-mod hd, pred firm, sbblky-amor, non calc, slty, Tr carb/glau, r micromic, loc v f sdy/slty Len.

Ls: lt olv gry, sft-firm, sbblky-blky, microxln, slily slty.

Dol: dusky yel brn, hd, brit, pity, arg, micro-arpxln, calc.

2407 - 2438 m MD (2407.2 - 2437.4 m TVD)

Ls: wh-v lt gry, loc Tr gn gry, lt brn gry, mod hd-fri, blky, crp-microxln, cln, pt Tr-com glau, r v arg, loc r Cht.

Clst: olv blk, dk gn gry, sft-firm, r mod hd, sbblky-amor, mod-v calc, slty, Tr-com glau.

2438 - 2653 m MD (2437.4 - 2647.4 m TVD)

Clst: olv blk, dk gn gry, sft-firm, sol, sbblky-amor, mod-v calc, slty, Tr-com glau, loc Tr euhd microxln Pyr.
Ls: wh-v lt gry, lt brn gry, mod hd-fri, blky, crp-microxln, cln, pt Tr-com glau, r v arg.

at 2570m: Sst: clr trnsl Qtz, vf - f, v srt, sbrndd - rndd, lse gr, tr glauc.

2653 - 2678 m MD (2647.4 - 2671.0 m TVD)

Clst: m lt - lt gry, mnr gn gry, v - mod calc, sft - frm, amor - sbblky, sli slty, pt glauc, r micromic, loc pyr.

Ls: wh-v lt gry, lt brn gry, mod hd-fri, blky, crp-microxln, oln, occ glau.

2678 - 3089 m MD (2671.0 - 3026 m TVD)

Clst: olv gry - olv blk, r dk gn gry, sft-firm, fri, pt sol, sbblky-amor, sli -v calc, pred mod calc, sli slty, pt glau/carb, r micromic, loc Pyr.

Ls: v lt gry, pl - dk yel brn, mod hd, brit-fri, blky-plty, loc crp-microxln, pt dol.

Dol: dusky yel brn, hd, brit, blky, microxln.

Cretaceous

Undiff.

Undiff.

Shetland

Kyrre

Kyrre

3089 - 3148 m MD (3026 - 3076 m TVD)

Clst:olv gry , sft-firm, sol, amor-sbblky, mod-v calc, sli slty, tr carb mat,tr glauc r micromic, v r Pyr.

Clst: olv gry - olv bik, sft-firm, fri, sbblky,sli-v calc, pred mod calc, sli slty tr carb mat, tr glauc, r micromic, loc tr Pyr.

Ls: gn gry-wh, frm-mod hd, blky, pt dol, micro - crpxln.

3148 - 3178 m MD (3076 - 3100 m TVD)

Clst: mod brn, sft - frm, amor - sbblky, sol, non calc, sli slty, r micropyr

Clst: olv gry , sft-firm, sol, amor - sbblky, mod-v calc, sli slty, tr carb mat, tr glauc, r micromic, v r Pyr.

Clst: olv blk , firm - mod hd, blky - sbblky, non - sli calc, sli slty, r glauc, r micromic, v r Pyr.

Ls: gn gry - wh, frm - mod hd, blky, pt dol, micro - crpxln.

3178 - 3207 m MD (3100 - 3130.5 m TVD)

Clst: gry blk, olv blk, brn blk, mod hd - fri, blky, sli slty, brit - fis, sli - mod calc, micromic, pyr nod, micropyr, Tr carb mat.

3178 - 3197m:
No dir fluor, slo strmg bl - wh fluor cut, no vis cut, mod spty bl wh fluor res, wk yel ring vis res.

3210 - 3300 m MD (3127 - 3199.0 m TVD)

Slty Sst: olv gry-dk grn gry, pred clr - mlky wh Qtz, with depth incr Mic, v f - f, pred v f, grdg Slst, mod - w srtd, subang - subrnd, v arg, v mic (pred Musc, Tr Biot), frm, Tr Pyr, carb, no vis por.

Sst: lt gry - m lt gry, pred clr - mlky wh Qtz, v f - f, r m, frm - fri, pred lse, abdt aggr, sbang - sbrnd, w srtd, Tr Mic, Tr Pyr, no - pr vis por.

on Sst: no stn, no od, no - spdt yel wh dir fluor, v wk - v slo strmg bl wh - yel wh fluor cut, no vis cut, no fluor resd, no vis resd.

3300 - 3342 m MD (3199.0 - 3237.5 m TVD)

Sst: olv gry - dusky yel brn, clr - trnsl Qtz, v f - f, locally m, Tr crs - v crs, sbang - sbrnd, mod - w srtd, frm - hd, mic, micropyr, sli calc cmt, sli sil cmt, sli slty, arg, r glau, r carb mat, no - mod vis por

(only in porous intervals) wk pet od, no oil stn, no dir fluor, pr - slo blmg dull bl wh fluor cut, no vis cut, pr dull bl wh even fluor res, no - pr yel ring vis res.

3342 - 3473 m MD (3237.5 - 3345.0 m TVD)

Sst: lt gry-gry, brn gry, clr-trnsl Qtz, f-m, occ m-crs, pred lse, sbang-sbrndd, mod-pr srt, tr mic, tr pyr, sli calc, tr carb mat

Clyst: olv blk-brn blk, mod hd-frm, blky, micromic, micropyr, non calc, carb mat loc coaly, pt slty

Coal: brn blk-blk, mod hd-hd, blky, conch

3357-3365m on Sst: no oil stn, spotty dull-pt bri yel dir flu (partly mineral flu) slo strmg bl wh- yel wh wk flu cut, no vis cut, wk bl wh flu resd, no vis resd

3473 - 3710 m MD (3345.0 - 3568.5 m TVD)

Clyst: olv blk-olv gry-dk gry - brn blk, frm-mod hd, blky, slty grdg Sltst, carb/coaly grdg Coal, micromic, micropyr

Sst: lt gry-gry, brn gry, clr-trnsl - milky Qtz, vf-m, non calc, tr crs, pred lse, sbang-sbrndd, pr srt, tr mic, tr pyr, sli calc, tr carb mat

Sltst: lt gry-m dk gry, off wh-lt brn, olv gry, sft-frm, blky, lam, tr mic, tr Coal frag, loc vf sdy/sdy lam, grdg vf Sst

Coal: brn blk-blk, mod hd-hd, blky, conch

3710m on Sst: no dir flu, slo strmg wk bl wh fluor cut, no vis cut, no fluor-v wk fluor resd, no vis resd

3710 - 3723 m MD (3568.5 - 3580.5 m TVD)

Sst: lt gry, clr-mlky Qtz, f-crs, tr v crs bom vf-slt, non calc, tr crs, pred lse, sbang-sbrndd, pr srt, tr mic
Slt+st: brn gry-brn blk, frm-blky, non calc, carb v arg grdg Clyst, tr vf sdy

3723 - 3775 m MD (3580.5 - 3631.7 m TVD)

Clyst: brn gry-brn blk, olv blk-brn blk, frm - blky, non calc, sl-non slty, tr micropyr, r micromic, sl carb

TD 3775 m MD (3631.7 m TVD)

I:\nsepberg\log\30916ael.dgn Jun. 22, 1999 09:46:49

INTERPRETATION RESULTS

DRILLING RESULTS

30/9-19

LEGEND:

Correlation of seismic event with log event (Seismic pick in site survey report)

Revised seismic pick (Based on log results)

COORDINATES:
Geographic:
60° 27' 35.38" N – 2 °41' 38.94" E

UTM:
6 702 819.9 mN – 483 176.9 mE
ED50, Zone 31 (CM 3° E).

RIG: West Delta RKB: 29 m

SPUD DATE: 09-09-1998

COMPLETION DATE: 22.12.1998

LEGEND:

– Clay/claystone
– Silt/Siltstone
– Sand/sandstone
– Limestone
– Cement plug

Seismic

Seismic source: 3D Exploration Seismic
Line: NH9201 Inline 439

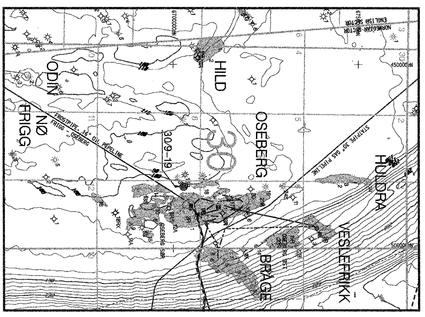
Well location

Prognosis						Stratigraphy					Gamma	Resistivity		Results
Reflectors	TWT (ms)	Int. Velocity (m/s)	Depth (m RKB)	Anomaly	Correlation	System	Series	Group	Formation	Informal Unit	GR 0 – 120	TVD	HART HLLS 0.2 – 20	Shallow Gas / Int. Velocity (m/s)
		1489												1489
Seabed	141		134											134 m (141 ms)
R2	151	1820	143											143 m (151 ms)
				Weak gas warning										1692
R3c	239	1830	223			QUATERNARY	PLEISTOCENE							217 m (239 ms)
R3	256		240								MW=1.05 sg	100		240 m (256 ms)
				No anomaly close to location								231 m		2196
R4	300	1840	282									200		282 m (300 ms)
BPLEI	327		309											289.5–292 m / 311 m (327 ms)
IPAN1	357		338											339 m (357 ms) / 340 m
														379.5–380.5 m
IPAN2	427	1950	406	Appr. 10 m SE of location			PLIOCENE					300		404.5 m (427 ms) 1954
														477–478 m
IPAN3	522		508	Appr. 200 m SW of location				NORDLAND				400		501.5 m (522 ms)
														501.5–533 m
						TERTIARY						500		Tophole section drilled with returns to seabed to 1200 m RKB. Background levels not recorded.
IP3	606	2150	598											586.5 m (606 ms) 2383
	627		621									600		623 m (627 ms)
TUTSI	642		637											644.5 m (642 ms)
									UTSIRA			700		
							L. MIOCENE							1898
												800		
BUTSI	946	2000	941											933 m (946 ms)
							E. MIOCENE		SKUE					954–955 m / 967.5–968.5 m / 971–973.5 m / 977.5 m (980 ms) 2673
TSKADE	983	2120	980									900		
BSKADE	997		995											998.5 m (995 ms)
												1000		
										INTRA HORDALAND				1040–1041 m / 1042.5–1044.5 m / 1052.5–1055.5 m / 1070 m (c. 1060 ms) 2200
												1100		1125 m (c. 1125 ms) 1692
														1148.5–1152.5 m / 1170.5–1173.5 m
		2090									MW=1.03 sg			1859
								HORDALAND				1200		
												1198 m		
														1257 m (c. 1267 ms)
	1273		1284				OLIGOCENE							1282 m
QNDI		2150										1300		1304.5–1310 m / 1315 m 2286
	1324		1338											
		2000												1380.5 m (c. 1376 ms)
TGRID	1397		1412					GRID				1400		Background gas level: 0.01% (C1-C3)
											MW=1.3 sg	1500		

NOTES:

The given stratigraphy is based on seismic correlation to other wells as no cuttings or coring is available above 1205 m RKB in well 30/9-19

INDEX MAP



Marine Surveys Section

Exploration and Production Division

Post Site Survey for Well 30/9-19

Competence for predicted lithology, stratigraphy, shallow gas and obtained drilling results

Drawing No.	1
Drawn by	ESA
Checked by	SRØ
Date	12.05.1999
File no.	m228d.dgn
Rev.	0
Scale	1:2000 A3

File: j:\survey\dat\vu80s2\geo\dwr\dwr228d.dgn