Final Well Report

Well 35/11-10 A

PL 090

HYDRO

STATOIL

Mobil

E&P Division

HYDRO

Access	Internal
Downgrading	
Retention	Experience

Title

FINAL WELL REPORT
WELL 35/11-10 A
LICENCE 090

Keywords

Geology, geophysics, petrophysics, site-survey, drilling.

Document category	Document ID	Amendment no.
Report	R-083609	

Area code	System code	Procurement ref./Package no.

SCM reference	Tag no.
29-00-NH-G15-00029	

Quadrant/Block/Well	Licence no.	Project
35/11-10 A	PL 090	Fram

Pages/appendices/volume(s)	Replaces
72/1/1	

	Name(s)	Org. unit	Date	Signed
Author(s)	Rune Nyby	Operation Geology	14.01.98	[signature]
Controlled	for Viggo Aggerholm	Operation Geology	14.01.98	Askè
Verified	Alfhild Skårnes	Operation Geology	14.01.98	Askè
Approved	Pål Kongsgården	Well Project Manager	14.01.98	[signature]

01M	12.12.97	Partner distribution					
Rev./					Disc.	Proj.	Hydro

Norsk Hydro Produksjon a.s F.nr. 930 187 240

Postal address:
P.O. Box 200
N-1321 STABEKK NORWAY

Office address:
Drammensveien 264
Vækerø, Oslo

Phone:
National: 22 73 81 00
Internat.: +47 22 73 81 00

Telefax:
National: 22 43 27 25
Internat.: +47 22 43 27 25

Telex:
72948 hydro n

NORSK HYDRO

FINAL WELL REPORT

WELL 35/11-10 A

DECEMBER 1997

LIST OF CONTENTS, WELL 35/11-10 A

PREFACE

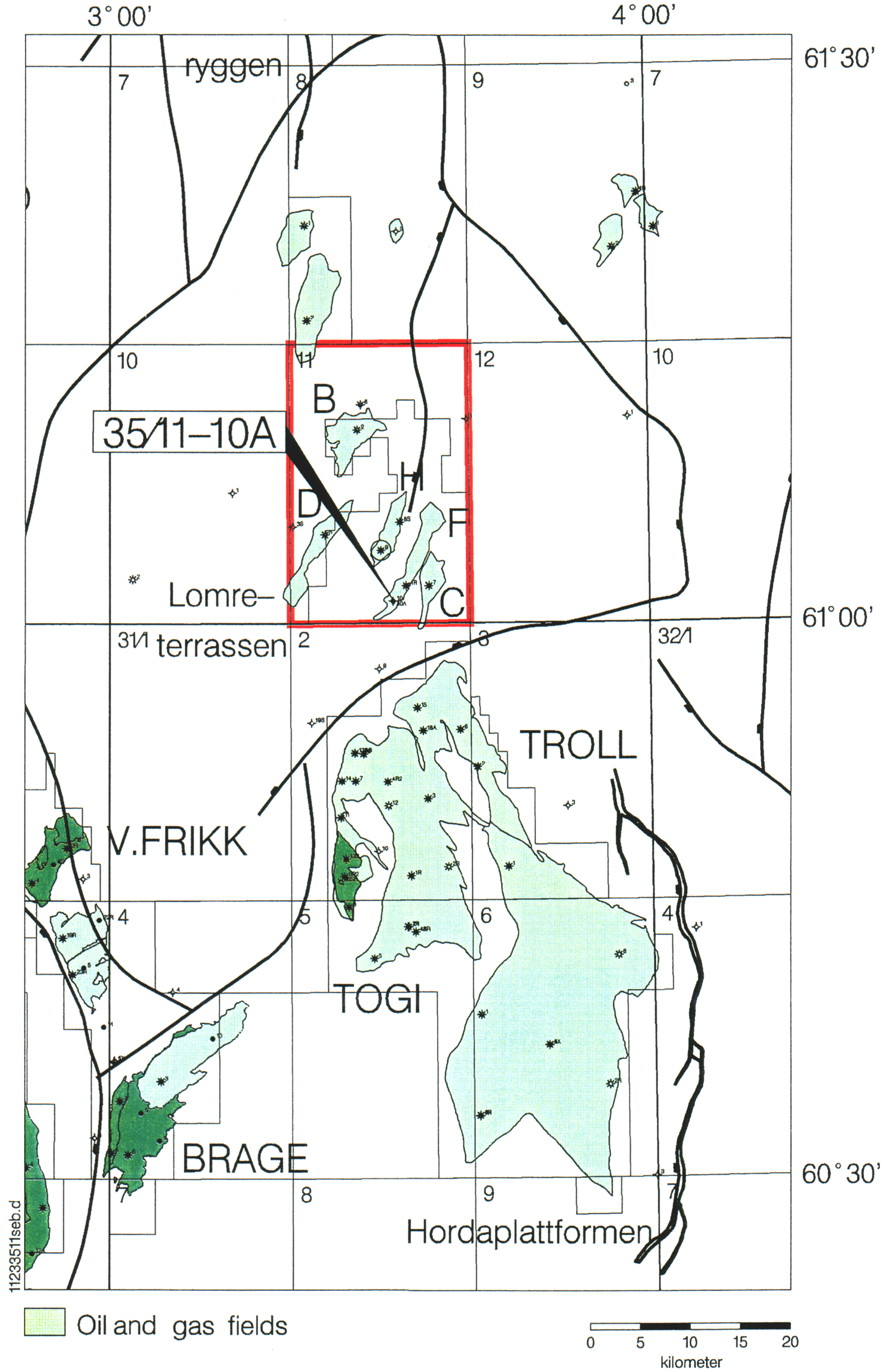
License PL 090 was originally awarded to the Norsk Hydro/Statoil/Mobil-group in 1984 with Mobil as the operator. Norsk Hydro took over operatorship 31.07.95.

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

Den Norske Stats Oljeselskap a.s. (Statoil):	50%
Norsk Hydro ASA (operator):	25%
Mobil:	25%

The well was drilled by Norsk Hydro ASA, on behalf of the group, during June and July 1997 (see location map, page II).

All depths in this report are mMD RKB unless otherwise stated



Location map

SUMMARY OF WELL DATA	
LOCATION:	61° 01' 10.54"N 03° 31' 26.29" E N 6 765 243.5 m E 528 323.1 m ED 50, UTM Zone 31, CM 03°E
OPERATOR: RIG: CONTRACTOR:	Norsk Hydro West Vanguard Smedvig
KB ELEVATION (to MSL): WATER DEPTH (MSL):	22 m 353.5 m
START OF OPERATIONS: WELL SPUDDED: REACHED TD ON: COMPLETED: STATUS: FORMATION AT TD:	23.06.97 Side-track from well 35/11-10 at 23.06.97 30.06.97 10.07.97 Dry. Permanently plugged and abandoned Sandstones in Oseberg Fm.
TD DRILLER (mRKB): TD LOGGER (mRKB):	3259m MD/2889m TVD 2761.4m MD. Not reached TD due to severe hole conditions.
DRILLING DEPTHS:	12 1/4" from 1180m to 2100m 8 1/2" to 3259m
CASING DEPTHS:	No casings or liners

NORSK HYDRO

FINAL WELL REPORT

WELL 35/11-10 A

DECEMBER 1997

351110A.SAM
J:\WELLSITE\3511-090\351110A\FWR

SECTION A

GEOLOGY

LIST OF CONTENTS SECTION A

SECTION A: LIST OF FIGURES, TABLES AND APPENDICES

1 OBJECTIVES

Well 35/11-10 A was drilled as an exploration side-track in well 35/11-10 into the F-Souhtwest compartment downfaulted to the west of the F-East structure. The objectives of the well were to:

-Test the presence of prospective hydrocarbons in the Sognefjord and the Fensfjord Formations.

-Obtain information about the interval velocity of the Draupne Formation relevant for depth conversion purposes in the Fram area.

-Obtain further information about the sedimentary facies distribution in the Sognefjord and the Fensfjord Formations.

-Test the presence of prospective hydrocarbons in the Brent Group.

2 RESULTS

All three prognosed reservoirs were waterbearing and the well was plugged and abandoned as a dry hole. Only negligible, and non economic amounts of hydrocarbons may be present in a channel the Ness Formation. The results are however not conclusive due to the lack of wireline logs and MDT pressure points over the actual interval (3091 - 3137m).

Although the negative results with respect to the lack of hydrocarbons, the well has given important stratigraphic information, relevant for the Fram geological models. In addition important velocity information for the Draupne Formation has been obtained, which has impact on the depth conversion in the area.

3 BIOSTRATIGRAPHY

The biostratigraphical evaluation of well 35/11-10 A was carried out by Stratlab. The analysed interval is 2210m - 3257m RKB, see figure 3.1.

Micropaleontological and palynological analyses has formed the basis for the biostratigraphical interpretation of the well. The analyses were carried out on cuttings samples and core samples. No sidewall cores were available.

Figure 3.1 on the next page shows a summarized chronostratigraphic and lithostratigraphic subdivision of the well. The biostratigraphic interpretation of the Jurassic is in accordance with Norsk Hydro's standard interpretation for the area. That is differing slightly from Geostrats. Further details may be found in "Norsk Hydro ASA 35/11-10 A, Biostratigraphy of the interval 2210m - 3257m".

HYDRO

WELL: 35/11-10A

NB! NOT TO SCALE

DEPTH MD RKB(TVD RKB) ELEVATION KB: 22m ALL DEPTHS IN METERS (mRKB)

CHRONOSTRATIGRAPHY

SYSTEM	STAGE	DEPTH m	THICKNESS m
		1180	
UNDIFFERENTIATED	UNDIFFERENTIATED	2210	1030
	Ryazanian	2220	10
JURASSIC	?Early-Middle (and poss?) Late Volgian	2280	60
		2290	10
	Middle-Late Kimmeridgian	2370	80
		2380	10
	Early Kimmerdgian	2390	10
	Late Oxfordian	2460	70
		2470	10
	Middle Oxfordian	2550	80
		2560	10
	Early Oxfordian	2650	90
		2660	10
	Late Callovian	2700	40
		2710	10
	Middle Callovian	2880	170
		2890	10
	Early Callovian	3020	130
		3030	10
	Middle-Late Bathonian	3060	30
		3070	10
	Early Bathonian	3090	20
	LATE BAJOCIAN	3160	70
	EARLY BAJOCIAN	3220	60
	AALENIAN (TOARCIAN?)	3259	39

LITHOSTRATIGRAPHY

GROUP	FORMATION
Kicked off at 1180 m MD from well 35/11-10	1180
HORDALAND	1421 (1413.5)
ROGALAND	BALDER 1477 (1463)
	SELE 1625 (1582)
	LISTA 1766 (1693.5)
	HEIMDAL 1867 (1772)
	LISTA 1896 (1795)
	VÅLE 2004 (1879)
SHETLAND	JORSALFARE 2203 (2034)
VIKING	DRAUPNE 2293 (2106)
	SOGNEFJORD 2457 (2238)
	HEATHER B 2681.5 (2416)
	FENSFJORD 2824 (2525)
	HEATHER A 3093 (2742.5)
BRENT	NESS 3143 (2786)
	ETIVE 3189.5 (2827.5)
	RANNOCH 3212 (2847.5)
	OSEBERG TD = 3259 (2889)

▧ Undifferentiated

Figure 3.1: Chronostratigraphy vs. lithostratigraphy

4 LITHOSTRATIGRAPHY

All depths are in mMD RKB (RKB is 22m).

This summary is compiled predominantly from ditch cuttings descriptions. No sidewall cores or conventional cores were cut in this well. Wireline and MWD logs were used to aid lithological interpretation and the placement of formation boundaries. The first drill cuttings samples were taken at 1180 m.

4.1 Hordaland Group (1180 - 1421m MD/1180 - 1414m TVD)

Top Hordaland Group was not seen in this well.

1180 - 1205m MD/1180 - 1205m TVD

This interval comprises siltstone with rare limestone stringers

SILTSTONE: brown black, firm, subfissile, slight calcareous, very micaceous, trace carbonaceous matter, trace micropyrite, trace glauconitic.

LIMESTONE: dark brown - moderate brown, very hard, generally crystalline, conchoidal fractures, cherty.

1205 - 1421m MD/1205 - 1413.5m TVD

This interval comprises claystone with limestone stringers.

CLAYSTONE: dark green grey, occasionally olive grey - grey, moderately hard, non - slight calcareous, micromiceous, silty, trace glauconitic, trace micropyrite, at base locally slight tuffaceous.

LIMESTONE: light grey - light brown, hard, blocky - subfissile, crystalline, occasionally argillaceous

AGE: Undifferentiated Tertiary

4.2 Rogaland Group (1421 - 2004m MD/1413.5 - 1879m TVD)

The Rogaland Group consists of the Balder, Sele, Lista, Heimdal and Våle Formations.

Balder Formation (1421 - 1477m MD/ 1413.5 - 1463m TVD)

The Balder Formation comprises claystone with minor tuff.

CLAYSTONE:	light grey - green, olive grey, firm - moderate hard, subblocky, non - slight calcareous, locally slight silty, trace micromiceous, trace micropyritic, trace glauconitic, in part tuffaceous.
TUFF:	light grey - light blue green, locally brown, speckled white - green - brown, firm, subblocky, occasionally slight calcareous.
AGE:	Undifferentiated Tertiary

Sele Formation (1477 - 1625m MD/1463 - 1582m TVD)

The Sele Formation comprises claystones with stringers of limestone.

CLAYSTONE:	predominantly olive grey, occasionally light grey - light blue grey, firm - moderately hard, subblocky, slight calcareous, trace micromiceous, trace glauconitic, rare trace micropyritic.
LIMESTONE:	generally medium light grey, becoming very light grey, moderately hard, blocky, crystalline.
AGE:	Undifferentiated Tertiary

Lista Formation (1625 - 1766m MD/1582 - 1693.5m TVD)

The Lista Formation comprises claystone and sandstone with stringers of limestone and rare sandstone laminations .

CLAYSTONE:	predominately olive grey - brown grey becoming varicoloured downwards (olive grey - medium dark grey, green grey - dark green), firm - moderately hard, subfissile, generally non calcareous, rare calcareous, occasionally silty, trace micromiceous, trace carbonaceous, trace micropyritic.

LIMESTONE: grey white, moderately hard, generally argillaceous grading to Marl, microcrystalline, in part dolomitic: pale - dark yellow brown, blocky, very hard, occasionally argillaceous, coarse crystalline, in part cryptocrystalline.

SANDSTONE: clear - milky Quartz, very fine - coarse, subangular - subrounded, loose.

From 1717 - 1766m also interbedded with:
SANDSTONE: light grey, clear - milky Quartz, fine - very coarse, rounded - angular, poor - moderately sorted, loose, trace glauconitic, trace micaceous, rare trace Pyrite.

AGE: Undifferentiated Tertiary

Heimdal Formation (1766 - 1867m MD/1693.5 - 1772m TVD)

The Heimdal Formation comprises sandstone.

SANDSTONE: light grey, clear to milky, occasionally green and rare smoky Quartz, medium - coarse, occasionally very coarse - pebbly, subangular - subrounded, rare rounded, rare angular, subspherical, moderately - poorly sorted, generally loose, increasingly friable and argillaceous matrix/cement towards base, rare calcareous cemented, glauconitic, trace Pyrite.

AGE: Undifferentiated Tertiary

Lista Formation (1867 - 1896m MD/1772 - 1795m TVD)

The Lista Formation comprises claystone.

CLAYSTONE: medium dark grey - olive grey, moderately hard, subfissile, generally non calcareous, in part very calcareous grading to Marl, micromicaceous, occasionally silty, trace carbonaceous, trace glauconitic, trace pyritic.

AGE: Undifferentiated Tertiary

Våle Formation (1896 - 2004m MD/1795 - 1879m TVD)

This interval comprises claystone with minor limestone.

CLAYSTONE: generally medium dark grey - olive grey, trace dusky yellow brown, firm - moderately hard, subfissile - blocky, generally very calcareous grading to Marl, silty, trace very fine sandy, trace pyritic, trace glauconitic, trace micromiceous.

LIMESTONE: white - very light grey, occasionally medium grey, firm, subblocky, locally with argillaceous laminations, occasionally very argillaceous grading to Marl, trace glauconitic, microcrystalline.

AGE: Undifferentiated Tertiary

4.3 Shetland Group (2004 - 2203m MD/1879 - 2034m TVD)

The Shetland Group consists of Jorsalfare Formation.

Jorsalfare Formation (2004 - 2203m MD/1879 - 2034m TVD)

The Jorsalfare Formation consists of claystone with beds of limestone.

2004-2105m

CLAYSTONE: medium grey - medium dark grey, firm - moderately hard, subblocky - blocky, in part amorphous, generally very calcareous grading to Marl, occasionally slightly silty, trace micromiceous, trace micropyritic, trace glauconitic

LIMESTONE: white - very light grey, light brown, firm - moderately hard, subfissile - blocky, occasionally slight argillaceous, locally very fine sandy, occasionally slight glauconitic, cryptocrystalline.

From 2105 - 2203m predominately:
CLAYSTONE: predominately grey - medium dark grey, olive grey, firm - moderately hard, subblocky - blocky, in part amorphous, generally very calcareous, locally grading Marl, becoming slight calcareous - calcareous at base, occasionally slightly silty, trace micromicaceous, trace micropyritic, trace glauconitic, trace Pyrite.

AGE: Undifferentiated Cretaceous

4.4 Viking Group (2203 - 3093m MD/2034 - 2742.5m TVD)

The Viking Group consists of the Draupne, Sognefjord, Heather B, Fensfjord and Heather A Formations

Draupne Formation (2203 - 2293m MD/2034 - 2106m TVD)

The Draupne Formation consists of claystone with rare limestone stringers.

CLAYSTONE:	brown black - grey black, occasionally medium dark grey - dark grey, soft - moderately hard, blocky - subfissile, earthy, generally non calcareous, occasionally very slight calcareous, carbonaceous - very carbonaceous, r - Tr Coal, silty, trace Pyrite, rare sandy.
LIMESTONE:	white - very light grey, light brown, firm - moderately hard, subfissile - blocky, occasionally slight argillaceous, locally very fine sandy, occasionally slight glauconitic, cryptocrystalline.
AGE:	?Early-Middle (and possible?) Late Volgian to Ryazanian

Sognefjord Formation (2293 - 2457m MD/2106 - 2238m TVD)

The Sognefjord Formation comprises alternating sandstones with interbedded siltstone and limestone/calcareous sandstone.

SANDSTONE:	light grey, clear - milky Quartz, fine - very coarse, generally fine to medium, subangular - subrounded, poor - moderately sorted, generally loose, at base occasionally hard, occasional silica cemented, occasionally argillaceous matrix, trace Mica, trace Glauconite, trace Pyrite, locally calcareous cemented.
SANDSTONE:	olive grey - brown grey, clear - milky Quartz, very fine - fine, rare - trace medium, subangular - subrounded, poor sorted, friable, non calcareous, very argillaceous/silty, carbonaceous, micaceous, trace Pyrite, rare trace Glauconite.
SILTSTONE:	brown black - olive black, trace olive grey, moderately hard, subfissile - fissile, locally blocky, generally non calcareous, occasional calcareous veins, micaceous, carbonaceous, pyritic.

LIMESTONE/ CALCAREOUS SANDSTONE: white - very light grey, calcarenite, in part coarse crystalline, hard, locally very sandy grading calcareous sandstone.

AGE: Late Oxfordian - Late Kimmeridgian

Heather B Formation (2457 - 2681.5m MD/2238 - 2416m TVD)

The Heather B Formation consists of claystone with stringers of limestone and rare sandstone.

CLAYSTONE: brown black - olive black, dusky yellow brown, locally medium dark grey - dark green grey, soft - moderately hard, subfissile - blocky, in part amorphous, generally slight - non calcareous, silty locally grading Siltstone, carbonaceous, micromiceous, trace Pyrite.

LIMESTONE: white - very light grey, firm - hard, blocky, locally very sandy grading calcareous Sandstone, locally very argillaceous grading Marl, cryptocrystalline.

SANDSTONE: very light grey - light grey, occasionally light brown, clear - milky Quartz, fine - medium, subangular - subrounded, moderately - well sorted, loose - hard, calcareous cemented, locally grading sandy Limestone, locally argillaceous matrix, occasionally carbonaceous, occasionally trace Glauconite.

AGE: Late Callovian - Middle Oxfordian

Fensfjord Formation (2681.5 - 2824m MD/2416 - 2525m TVD)

The Fensfjord Formation consists of sandstone with minor claystone and rare limestone stringers.

SANDSTONE: very light grey, clear - milky Quartz, very fine - medium, trace coarse, generally fine to medium, subangular - subrounded, trace angular, trace rounded, generally moderately sorted, loose, hard when cemented, common calcareous cemented, trace Mica, trace carbonaceous, trace Glauconite.

CLAYSTONE: brown black - olive black, becoming predominately dark grey - olive grey below 2752m, generally moderately hard, locally soft below 2752m, subfissile - fissile, slight - non calcareous, becoming very calcareous grading Marl below 2752m, generally silty, in part very fine sandy grading Sandstone below 2752m, carbonaceous, predominately micromiceous, rare trace micropyritic.

LIMESTONE: white - very light grey - grey, moderate hard, subblocky, locally argillaceous laminae grading Marl, trace glauconitic, generally microcrystalline, rare coarse crystalline.

AGE: Middle - Late Callovian

Heather A Formation (2824 - 3093m MD/2525 - 2742.5m TVD)

The Heather A Formation consists of claystones with stringers of sandstone and limestone.

2824 - 2926 m predominately:

CLAYSTONE: grey brown - olive grey, firm - moderately hard, subblocky, calcareous - very calcareous, locally grading Marl, silty - very silty, trace carbonaceous.

LIMESTONE/ CALCAREOUS SANDSTONE: very light grey - grey, occasionally white, firm - moderately hard, subblocky, microcrystalline, generally argillaceous, occasionally grading Marl, sandy: clear - frosty Quartz, generally medium, occasionally fine - coarse, carbonaceous, trace Glauconite, trace Pyrite.

SANDSTONE: clear - milky Qtz grains, predominately fine - medium, occasionally fine - coarse, subangular - subrounded, moderately sorted, loose, Tr carbonaceous.

From 2926 - 3093 predominately:

SILTY CLAYSTONE: brown grey - dusky yellow brown, firm, fissile - blocky, occasionally amorphous, calcareous, generally silty, grading Siltstone, locally very fine sandy, in part grading Sandstone, generally carbonaceous, micromiceous, trace micropyritic.

AGE: Late Bajocian - Middle Callovian

4.5 Brent Group (3093 - 3259m MD/2742.5 - 2889m TVD)

The Brent Group consists of the Ness and Etive, Rannoch and Oseberg Formations.

Ness Formation (3093 - 3143m MD/2742.5 - 2786m TVD)

The Ness Formation comprises sandstone/siltstone and claystone seams of coal.

SANDSTONE/ SILTSTONE:	olive grey - brown grey, clear - milky Quartz, very fine - fine, trace medium, subangular - subrounded, moderately sorted, friable - loose, locally argillaceous matrix/cement, locally very carbonaceous, very silty grading Siltstone, trace Mica, generally micromiceous.
CLAYSTONE:	olive grey - dark grey, soft, amorphous, sticky, very fine sandy grading Sandstone, carbonaceous, trace micromiceous, trace pyritic.
COAL:	black - brown black, hard, brittle, blocky - locally platy, vitreous, laminated, argillaceous grading bituminous Shale, rare - trace micropyrite.
AGE:	Late Bajocian

Etive Formation (3143 - 3189.5m MD/2786 - 2827.5m TVD)

The Etive Formation comprises sandstone with coal stringers.

SANDSTONE:	clear - milky Quartz, fine - medium, trace coarse, subangular - subrounded, moderately sorted, loose, trace silty, trace carbonaceous matter, trace Mica, trace Glauconite.
COAL:	black - brown black, hard, brittle, vitreous, laminated, argillaceous, grading bituminous Shale.
AGE:	Early - Late Bajocian

Rannoch Formation (3189.5 - 3212m MD/2827.5 - 2847.5m TVD)

The Rannoch Formation comprises siltstone.

SILTSTONE:	light brown - dark grey, soft - firm, blocky, amorphous, generally calcareous, locally very calcareous grading Marl,

generally very argillaceous grading Claystone, micromiceous, carbonaceous matter.

AGE: Early Bajocian

Oseberg Formation (3212 - 3259m MD/2847.5 - 2889m TVD)

The Oseberg Formation comprises sandstone.

SANDSTONE: light grey, clear - milky Quartz, very fine - coarse, generally medium, angular - subrounded, moderately - in part poorly sorted, loose, in part very argillaceous cement/matrix (Kaolin), becoming calcareous cemented, trace Mica, trace Chlorite.

AGE: Aalenian (Toarcian??) - Early Bajocian

5 HYDROCARBON SHOWS

The evaluation of hydrocarbon shows at the wellsite was carried out in a conventional manner. A standard (Baker Hughes Inteq) 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 1180m down to the TD of the well.

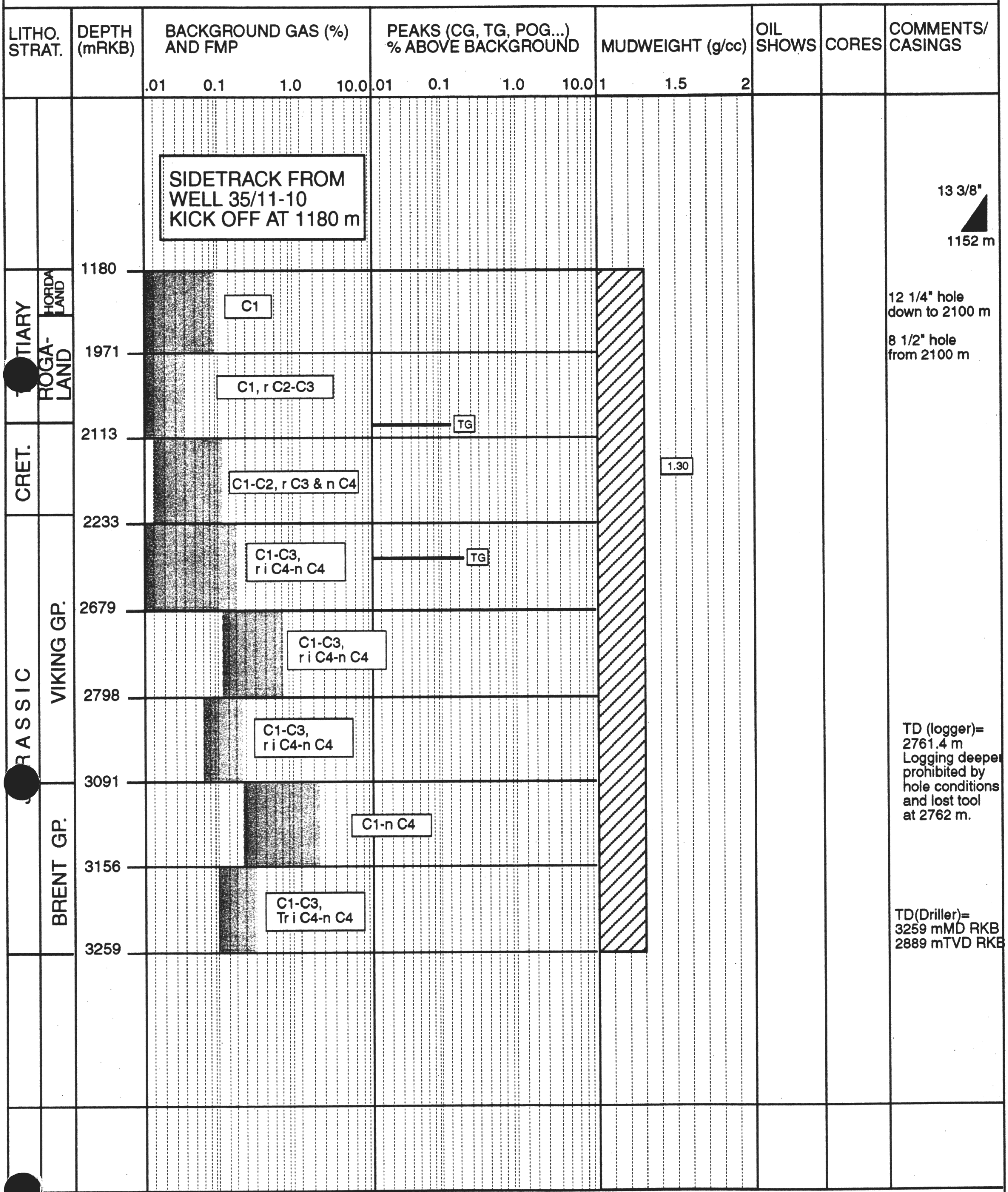
Hydrocarbon shows on ditch cuttings were evaluated according to procedures described in Norsk Hydro's "Wellsite Geologist's Manual".

5.1 Gas Record

1180 - 3259m MD

The gas summary for the well is presented in the Figure 5.1 on the next page.

GAS SUMMARY WELL: 35/11-10 A



NOTE: NOT TO SCALE

Figure 5.1 Gas Summary

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

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
2105-2209	Cuttings	Limestone	weak - moderate yellow direct fluorescence, no - very slow streaming blue white fluorescent cut, no visible cut, no - weak milky fluorescent residue, no visible residue.
2209-2439	Cuttings	Sandstone	no direct fluorescence, very slow streaming blue white fluorescent cut, no visible cut, white fluorescent residue, no visible residue.
2209-2439	Cuttings	Limestone/ Calcareous Sandstone	no direct fluorescence, moderate streaming blue white fluorescent cut, no visible cut, very weak white fluorescent residue, no visible residue.
2209-2439	Cuttings	Siltstone	no direct fluorescence, moderate streaming blue white fluorescent cut, no visible cut, strong yellow white fluorescent residue, very pale straw visible residue
2439-2680	Cuttings	Limestone/ Calcareous Sandstone	no direct fluorescence, moderate streaming blue white fluorescent cut, no visible cut, very weak white fluorescent residue, no visible residue.
2439-2680	Cuttings	Claystones	no direct fluorescence, slow - fast streaming blue white fluorescent cut, no visible cut, very weak blue white fluorescent residue, no visible residue.
2824-3090	Cuttings	Claystone	no direct fluorescence, slow - very slow streaming blue white fluorescent cut, no visible cut, weak blue white fluorescent residue, no visible residue.
3090-3137	Cuttings	Sandstone	spotted bright yellow direct fluorescence, moderate fast streaming yellow white fluorescent cut, no visible cut, white fluorescent residue, no visible residue.

Table 5.1. Shows summary

6 CORING

6.1 Conventional cores

No cores were taken in this well

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/MCFL/TDL/CNL/GR/AMS/SP	01.07.97		Misrun
HALS/MCFL/TDL/CNL/GR/AMS/SP	02.07.97	2071 - 1150	1A
HALS/MCFL/TDL/CNL/GR/AMS/SP	03.07.97	2755 - 2035	1B
VSP/GR	03.-05.07.97	Not logged, tool lost in hole.	Misrun
FMI/DSI/NGT	06.07.97	2728.5 - 1150	1A
MDT/VSP/GR/AMS (on TLC)	06.-09.07.97	2720 - 1380	1A

Table 7.1: Wireline logs

7.2 MWD logs

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

1180 - 3259m

Detailed MWD results can be found in the report "End of Well Report 35/11-10 & 35/11-10 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.	Circ. time
HALS/MCFL/TDL/CNL/GR/AMS/SP	1A	2071.00	52.00	12hrs 40 min	2hrs 45min
HALS/MCFL/TDL/CNL/GR/AMS/SP	1B	2755.00	80.00	11hrs 15 min	2hrs
FMI/DSI/NGT/AMS	1A	2728.50	76.00	10hrs 15 min	1hr 50min
MDT/VSP/GR/AMS	1A	2720.00	89.00	37hrs 25min	1hr 30min

Table 7.2: Bottom hole temperatures from logs

8 PETROPHYSICAL RESULTS

The petrophysical evaluation was based on log data (no cores were cut).

There is no wireline data from the Brent Group (which is water bearing), due to hole conditions. That is, no wireline tool could pass tight spot at approximately 2750 m MD RKB. Though, LWD GR and resistivity data are available to TD.

From the MDT pretests a water gradient of 1.02 g/cc is interpreted for both the Sognefjord and the Fensfjord Formation, and the two acquifers seems to be in communication. (The Brent Group was not covered, due to tight hole.)

The results of the Sognefjord and Fensfjord Formation is presented in Table 8.1.

The sensitivities of the average petrophysical output parameters were found. (See "Formation Evaluation Report, well 35/11-10A").

In the Sognefjord and Fensfjord Formation there is 29 and 18 (down to 2750 m MD RKB) metres of net reservoir with an average porosity of 24 and 23 % respectively.

For more details regarding the petrophysical interpretations, reference made to "Formation Evaluation Report, well 35/11-10A".

ZONE AVERAGES					
Zone	*Interval [m MD RKB]*	*Interval [m TVD MSL]*	*Net res [m]*	*N/G*	*Porosity [%]*
Sognefjord	2293.0-2457.0	2084.0-2216.0	29.1	0.22	24.2
Fensfjord*	2681.5-2824.0	2394.0-2503.0	17.7	0.16	23.4

DISCRIMINATION CRITERIA (INCLUSIVE) FOR NET RES AND NET PAY				
Criteria	Min	Max.	Net Res	Net Pay
Shale content	0.00	0.40	Yes	Yes
Log porosity, Phie	0.11	1.00	Yes	Yes
Water saturation, Swe	0.00	0.60	No	Yes

Table 8.1: Petrophysical summary in ***TVD depth***, Early Oxfordian Turbidite

*: Calculated down to 2750 m MD RKB, due to only LWD GR and resistivity below this depth.

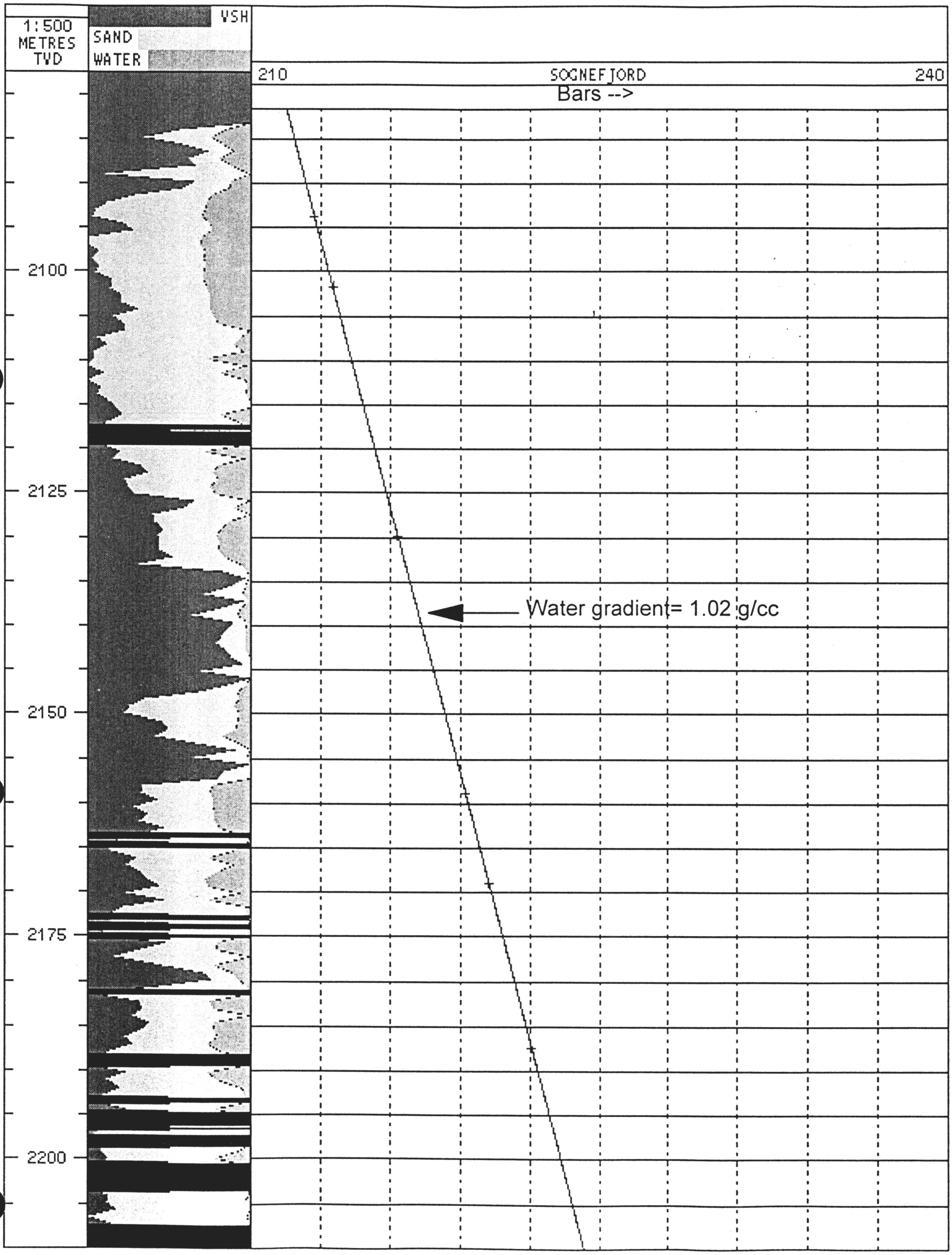


Figure 8.1: Pressure points in the Sognefjord Formation

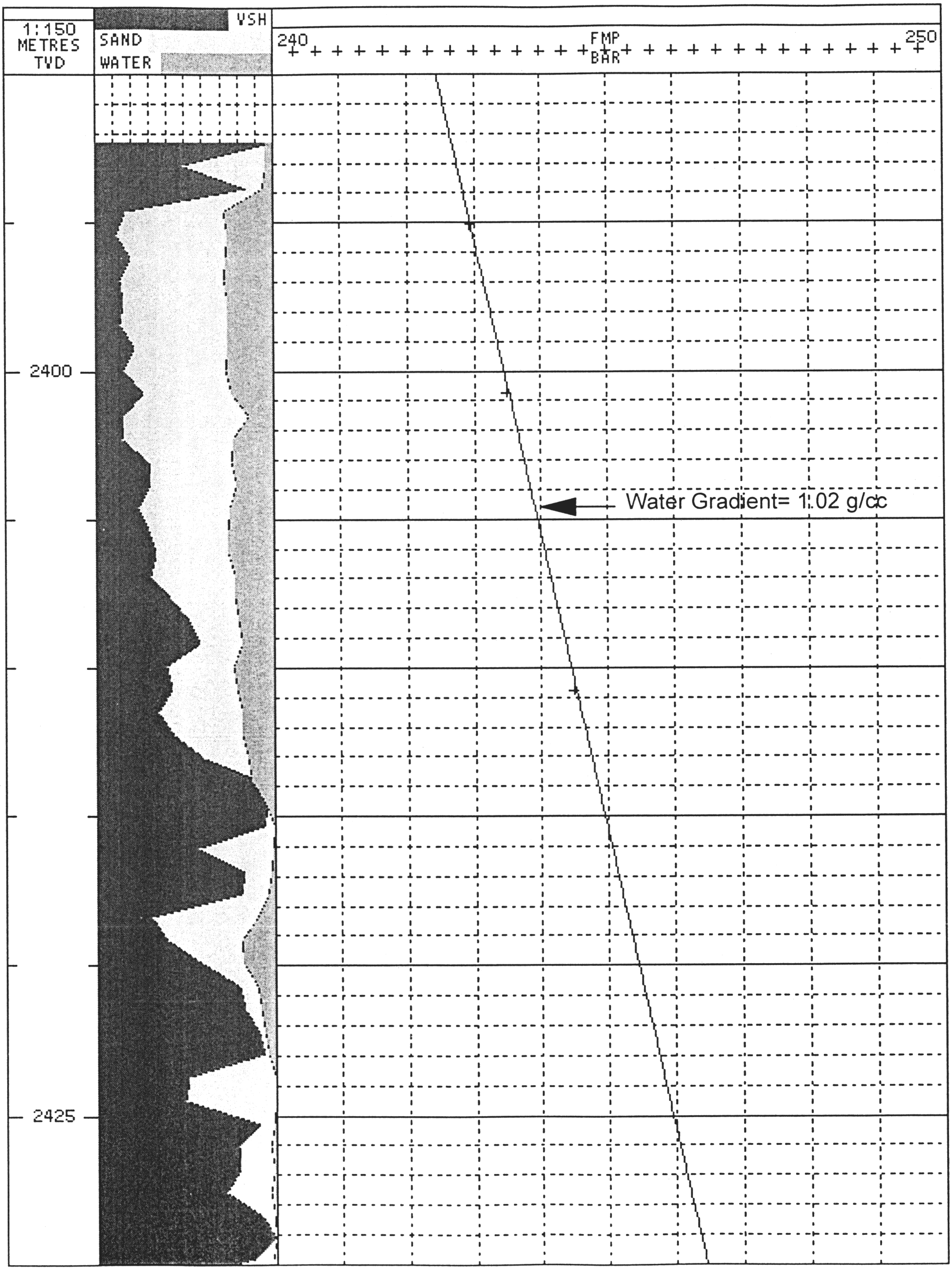


Figure 8.2: Pressure points in the Fensfjord Formation

9 GEOPHYSICAL RESULTS

The prognosed times and depths are shown in Table 9.1 together with the actual times and depths from the well. All reflectors from Top Shetland Group and below have been interpreted on the reprocessed survey MN920196. In addition, Top Balder Formation was verified with minor adjustments from previous work on MN9201. Top and Base Intra Lista Sandstone (sometimes referred to as Heimdal Formation) observed in well 35/11-10 have been interpreted into F-Southwest from F-East. The lack of actual time picks for the seabed and Top Brent Group are due to the fact that no calibrated sonic exists at these levels.

It is not easy to get a perfect match between the synthetic seismogram and the seismic data, because the reflectors are poorly defined in this area mainly due to faults. However, the best reflector to correlate is Top Shetland, which is the only reflector with a good interpretation confidence in the well area. To get a perfect match at Top Shetland Group the seismic has to be shifted up 8 - 10 ms., which seems to be the case for the other reflectors as well.

The geophysical prognosed depths are all within the expected uncertainties except the Top Intra Lista Sandstone. The interpretation confidence level are low at both Top and Base Intra Lista Sandstone which might cause the mismatch between the prognosed and actual depth.

Reflectors younger than Base Cretaceous have been depth converted by using linear velocity methods assuming that the velocity increases linearly with depth. Base Cretaceous was depth converted using calibrated stacking velocities from the reprocessed MN920196 survey. All reflectors below Base Cretaceous Unconformity are depth converted using interval velocities based on well data from Base Cretaceous and down to the respective horizon.

The Base Cretaceous, Top Sognefjord and the Base Sognefjord reflectors do have a low interpretation confidence level in the well area because they are placed in a shadow zone of an antithetic fault. Minor adjustments have been made on the reflectors below Base Cretaceous after well 35/11-10 A.

The mismatch at Top Brent must be due to the depth conversion because the interpretation has a good confidence in this area. The interval velocity used from Base Cretaceous and down to the Brent Group is a constant velocity based on several wells in the Fram area. This interval velocity might be underestimated as it was to the well 35/11-10.

Location: Well 35/11-10 A

Spud location [m] UTM: 528323.08 E 6765243.58 N
TD location [m] UTM: 527178.93 E 6765271.74 N

Formation tops	Time [ms] TWT			Depth [m] TVD MSL			
	Prognosis	Actual	Result	Prognosis	Uncertainty	Actual	Result
Seabed				360	+ -1	353,5	-6,5
Top Balder Fm.	1516	1507	-9	1405	+ -15	1391,5	-13,5
Top Intra Lista sst.	1723	1750	27	1693	+ -15	1671,5	-21,5
Base Intra Lista sst.	1798	1809	11	1753	+ -25	1750	-3
Top Shetland Gp.	1905	1895	-10	1840	+ -20	1857	17
Top Draupne Fm.	2020	2001	-19	2005	+ -30	2012	7
Top Sognefjord Fm.	2076	2058	-18	2084	+ -30	2084	0
Base Sognefjord Fm.	2159	2134	-25	2241	+ -30	2216	-25
Top Fensfjord Fm.	2243	2237	-6	2370	+ -45	2394	24
Top Brent Gp.	2440			2691	+ -35	2720,5	29,5

Table 9.1: Geophysical summary

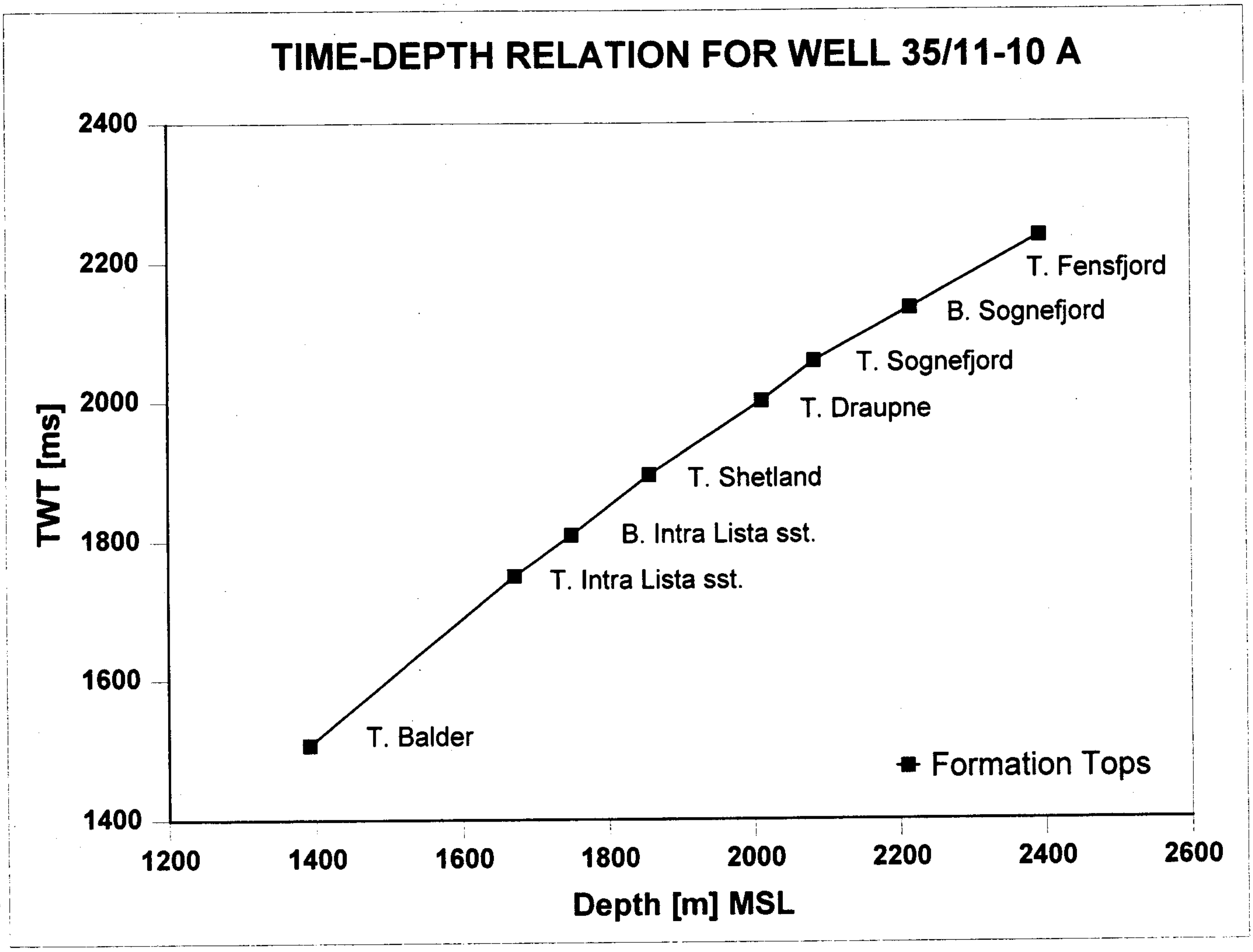


Figure 9.1: Time versus depth plot

10 POST SITE SURVEY REPORT

As well 35/11-10 A has been drilled as a side track to well 35/11-10, reference on Post Site Survey results are made to "Final Well Report 35/11-10.

11 STANDARD AND SPECIAL STUDIES

- **Norsk Hydro,1997:** PL 090 - Well Programme - Well 35/11-10 A
- **Norsk Hydro,1997:** Formation Evaluation Report, well 35/11-10A.
- **Norsk Hydro,1997:** Final VSP Report, well 35/11-10A
- **Baker Hughes Inteq,1997:** End of Well Report, 35/11-10 & 35/11-10 A.
- **Baker Hughes Inteq,1997:** End of Well Report, Mudlogging, 35/11-10 & 35/11-10 A.
- **Stratlab,1997:** Norsk Hydro ASA 35/11-10 A, Biostratigraphy of the interval 2210m - 3257m.

APPENDIX I

WELL SUMMARY

GEOLOGICAL WELL SUMMARY

MDT RESULTS

WELL SUMMARY: 35/11 - 10 A

Koord: 61° 01' 10.54"N
03° 31' 26.29"E

UTM: 6 765 243.5mN
528 323.1mE

Zone: ED50, UTM Zone 31, CM 03° E

Line: MN9201, in line 5385, x-line 1871

Rig: West Vanguard

Waterdepth: 353.5 m (MSL)

Stopped in: Sandstone, Oseberg Fm.

Date sidetracked from 35/11-10: 23.06.97

At T.D.: 30.06.97

Completed: 10.07.97

T.D. Driller: 3259m MD RKB
2889m TVD RKB

T.D. Logger: 2761.4 m MD RKB

Wireline Logging: Schlumberger

Mudlogging: Baker Hughes Inteq

WELL:

35/11-10A

COUNTRY

Norway

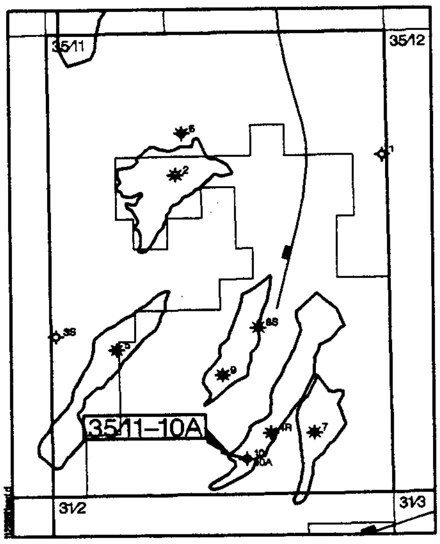
OPERATOR Norsk Hydro **LICENCE** 090

OWNED BY: Hydro/Statoil/Mobil

TARGETS
Primary: Sognefjord, Fensjord Fm. & Brent Gp.
Secondary:

RESULTS

Dry Well. Permanently plugged and abandoned



CASING

30" @ 435 m
13 3/8" @ 1152 m

CORES

None

GAS RECORD

1180-1971 m: 0.01-0.09% C1
1971-2113 m: 0.01-0.05% C1, r C2-C3
2113-2233 m: 0.02-0.17% C1-C2, r C3 & n C4
2233-2679 m: 0.01-0.30% C1-C3, r i C4-n C4
2679-2798 m: 0.13-0.81% C1-C3, Tr i C4-n C4
2798-3091 m: 0.07-0.37% C1-C3, r i C4-n C4
3091-3156 m: 0.40-3.6% C1-n C4
3156-3259 m: 0.10-0.47% C1-C3, Tr i C4-n C4

LOGS

HALS/MCFL/TDL/CNL/ GR/AMS/SP 2071 - 1150 m	1A
HALS/MCFL/TDL/CNL/ GR/AMS/SP 2755 - 2035 m	1B
FMI/DSI/NGT/AMS 2728.5 - 1150 m	1A
MDT/VSP/GR/AMS 2720 - 1380 m	1A

OIL SHOWS

2105 - 2209 m: Locally weak shows on Limestone
2209 - 2439 m: Weak shows on sandstone
2439 - 3090 m: Weak shows on calc cemented sandstone and claystone
3090 - 3137 m: Spotty weak shows on sandstone aggregates
3137 - 3259 m: No shows

GEOLOGICAL WELL SUMMARY

HYDRO

DEPTH m MD RKB	LITHO SECTION	SYSTEM	SERIES/STAGE	GROUP	FORMATION	DESCRIPTION	SHOWS	Located on: MN9201, in line 5385, x-line 1871 61° 01' 10.54N 6 765 243.5mN 03° 31' 26.29E 528 323.1mE Water depth: 353.5 m (MSL) RKB: 22 m	WELL **35/11-10A**

Depth scale (m MD RKB): 50, 100, 150, 200, 250, 300, 350, 400, 450, 500, 550, 600, 650, 700, 750, 800, 850, 900, 950, 1000, 1050, 1100, 1150, 1200, 1250

Kick off point from well 35/11-10: 1180 m

13 3/8" 1152 m

System: TERTIARY; Group: HORDALAND

Sltst: brn blk, frm, subfis, sl calc, v mic, arg, carb, Tr micropyr, Tr glauc.
1205 m: Top Green Clay

Clst: pred gn gry, mod hd, non calc, micromic, slty, glauc/micropyr, r **Tf.**

Depth scale (m MD RKB): 1300, 1350, 1400, 1450, 1500, 1550, 1600, 1650, 1700, 1750, 1800, 1850, 1900, 1950, 2000, 2050, 2100, 2150, 2200, 2250, 2300, 2350, 2400, 2450, 2500

System: TERTIARY — Group: HORDALAND

Group: ROGALAND

Balder

1421 m (1413.5 m TVD)
Clst: gn gry-olv gry, frm-mod hd, sbblky, non calc, glauc.
1477 m (1463 m TVD)
Tf: lt gry-lt bl gn, frm, l.P. calc

Sele

Clst: pred olv gry, frm, sbblky, sl calc, Tr micromic/Pyr/glauc, Tr slty

Lista

1625 m (1582 m TVD)
Clst: varicol olv gry-brn gry, frm, subfis, non calc, slty, Tr micromic/ glauc, loc vf sdy, r **Ls/Dol** strgs

Heimdal

1766 m (1693.5 m TVD)
Sst: lt gry, f-v crs, pred m-crs, gen lse, bcm incr arg Mtrx/Cmt, Tr Glauc.

Lista

1867 m (1772 m TVD)
Clst: dk gry, mod hd, Tr carb, loc Mrl.

Våle

1896 m (1795 m TVD)
Ls: wh-m gry, frm, loc grad **Mrl**
Clst: olv gry, Tr dusky yel brn, frm, gen calc i.p. grad **Mrl**, Tr vf sdy, Tr Pyr/glauc, Tr micromic.

System: CRETACEOUS — Series: Undifferentiated — Group: SHETLAND

Jorsalfar

2004 m (1879 m TVD)
Ls: wh-v lt gry, mod hd, chky, Tr Glauc, loc arg grad **Mrl**
Sst: f-m, Tr crs, lse, Glauc, Pyr.
Clst: m dk - dk gry, olv gry, frm-mod hd, sbblky, v calc, grad **Mrl**, bcm, slily calc at base, Tr micromic/glauc/ pyr.

System: JURASSIC — Series: R, Volgian, Kimmerdgian, Oxfordian — Group: VIKING

Draupne

2203 m (2034 m TVD)
Clst: brn blk-gry blk, frm, blky-subfis, ea, slty, carb-v carb, non calc, r Tr sd, pyr.

Sognefjord

2293 m (2106 m TVD)
Sst: lt gry, clr, mky Qtz, f-crs, gen f-m, sbang-sbrnd, lse, Tr arg Mtx
Sst: olv gry-brn gry, clr & mky Qtz, vf-f, sbang-sbrndd, fri, non calc, v arg, slty
Ls/calc Sst: wh-v lt gry, clr, hd, loc v sdy

Heather B

2457 m (2238 mTVD)

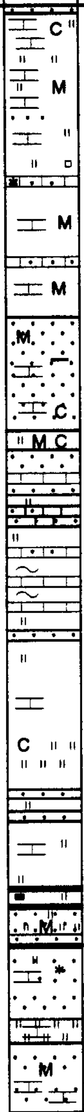
GEOLOGICAL WELL SUMMARY

HYDRO

Located on: MN9201, in line 5385, x-line 1871
61° 01' 10.54N — 6 765 243.5mN
03° 31' 26.29E — 528 323.1mE
Water depth: 353.5 m (MSL) RKB: 22 m

WELL **35/11-10A**

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



SYSTEM: JURASSIC
SERIES/STAGE: Oxfordian, CALLOVIAN, BATHONIAN, BAJOCIAN, Aal.
GROUP: VIKING, BRENT
FORMATION: Heather B, Fensfjord, Heather A, Ness, Etive, R, Oseb.

DESCRIPTION

Clst: brn blk - olv blk, sft - mod hd, gen sli - non calc, slty grad **Sltst**, carb micromic, Tr Pyr. Also **Clst:** m dk gry - dk gn gry, frm - mod hd, non calc

Ls: wh - v lt gry, frm - hd, v sdy grad calc **Sst**, loc arg Mtrx, occ Tr Glauc

2681.5 m (2416 m TVD)
Sst: v lt gry - lt gry, gen f - m, mod srt, loc calc cmt, Tr Mic, Tr carb.

Clst: brn blk - olv blk, mod hd, sli - non calc, gen slty, carb, micromic, also **Clst:** dk gry - olv gry, sft - mod hd, gen v calc grad **Mrl**.

2824 m (2525 m TVD)
Clst: gry brn - olv gry, gen frm - mod hd, calc - v calc, loc grad **Mrl**, slty, from 2926 m bcm pred brn gry - dusky yel brn, frm, slty grad **Sltst**, loc vf sdy, carb, micromic

Ls/Calc Sst: v lt gry - gry, occ wh, frm - mod hd, gen arg, microxln/ sandy: gen m, carb, Tr Glauc.

3093 m (2742.5 m TVD)
Sst: olv gry - brn gry, vf - f, fri - lse, v slty grad **Sltst**, gen micromic. **C:** blk - brn blk, hd, brit, vit, lam, arg grad bit **Sh**.
3143 m (2786 m TVD)
Sst: lse, f - m, Tr slty, carb, Tr Mic Tr Glauc.

3189.5 (2827.5 m TVD)
Sltst: lt brn - dk gry, sft - frm, gen calc loc calc grad Mrl, gen v arg grad **Clst**
3212 m (2847.5 m TVD)
Sst: lt gry, gen m, I.P. v arg Mtrx/cmt (Kao) bcm calc cmt, Tr Mic, Tr Chlor

TD (driller): 3259 m (2889 mTVD)

Aal: Aalenian (Toarcian?)
R : Ryazanian
R : Rannoch Fm.

DEPTH m MD RKB	Scale
2500	3750
2550	3800
2600	3850
2650	3900
2700	3950
2750	4000
2800	4050
2850	4100
2900	4150
2950	4200
3000	4250
3050	4300
3100	4350
3150	4400
3200	4450
3250	4500
3300	4550
3350	4600
3400	4650
3450	4700
3500	4750
3550	4800
3600	4850
3650	4900
3700	4950

FORMATION PRESSURE WORKSHEET

HYDRO

Well Name : 35/11-10 A   Rig : West Vanguard   Date : 06.-07.07.97

Pressure Units : Bars   RKB-MSL : 22 m.   MSL-SBed: 353.5 m.   Witnessed by : Nyby/Bremmeng

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
														Main	HC Gravity	Sample	
1A	mMD RKB	mTVD RKB	Qtz	Strain	Qtz	Strain	Qtz	Strain	Set	Retract	sg EMD	degC	Y/N	Fluid Type	g/cc	Vol, cc	Mobility (mD/Cp)
1A/1	2305.0	2115.7	274 247	274.47	212 694	213.05	274 026	274.39	09:40	09:45	1 025	71.6	Y				854.4
1A/2	2314.9	2123.7	275 407	275.70	213 519	213.92	275 389	275.67	10:00	10:05	1 025	74.2	Y				365.5
1A/3	2350.0	2151.8	278 712	279.02	216 279	216.68	278 756	279.10	10:20	10:25	1 025	76.2	Y				460.9
1A/4	2386.0	2180.8	282 405	282.82	219 204	219.64	282 495	282.67	10:58	11:00	1 025	78.2	Y				472.5
1A/5	2398.5	2190.9	284 179	284.50	220 200	220.65	284 231	284.61	11:20	11:28	1 025	79.4	Y				34.8
1A/6	2421.5	2209.5	286 383	286.74	222 024	222.47	286 466	286.82	11:43	11:50	1 024	80.1	Y				28.2
1A/7	2682.6	2417.0	313 226	313.59	242 947	243.40	313 196	313.71	12:50	12:54	1 025	86.0	Y				2779.0
1A/8	2690.0	2422.7	314 193	314.58	243 484	243.94	314 404	314.78	13:15	13:16	1 025	87.7	Y				675.0
1A/9	2702.5	2432.3	315 789	316.21			315 886	316.11	13:25	13:28		88.4	N				Low permeable
1A/10	2703.0	2432.7	315 919	316.33	244 490	244.95	315 980	316.36	13:35	13:40	1 025	88.7	Y				114.8

NB: Fmtn Press sg calculated from RKB

SECTION B

OPERATIONS

Prepared by: ______________________ Drilling Engineer

Verified by: ______________________ Senior Drilling Engineer

Approved by: ______________________ Drilling Superintendent

Norsk Hydro

GENERAL INFORMATION ON WELL 35/11-10 A PO:1

Field : UNDEFINED   Country: NORWAY
Licence : 90
UTM zone : 31   Central Meredian: 3' E   Horiz. Datum: ED50

LOCATION coordinates:		Surface	Target
UTM	N [m]:	6765243.5	0.0
UTM	E [m]:	528323.1	0.0
Geographical	N :	61 01'10.54"	
Geographical	E :	03 31'26.29"	

Water depth : 354 m   Reference point height: 22 m
Formation at TD : Oseberg Fm.

Operator : NORSK HYDRO PRODUKSJON A/S   Share: 25.00 %

Partners : DEN NORSKE STATS OLJESELSKAP A/S   Share: 50.00 %
MOBIL EXPLORATION NORWAY INC.   Share: 25.00 %

RIG NAME : WEST VANGUARD

Total depth (RKB) : 3259 m MD   2889 m TVD

TIME SUMMARY

Start time : 23-jun-1997 12:00
Spudding date : 23-jun-1997
Abandonment date: 10-jul-1997

Main operation	Hours	Days	%
DRILLING	216.5	9.0	53.3
FORMATION EVALUATION LOGGING	97.0	4.0	23.9
PLUG AND ABANDONMENT	33.5	1.4	8.2
DOWNTIME DRILLING	6.0	0.2	1.5
DOWNTIME FORM. EVAL. LOGGING	53.5	2.2	13.2
Sum	406.5	16.9	

Hole and casing record

Hole	Depth [m MD]	Casing	Depth [m MD]
12 1/4"	2100		
8 1/2"	3259		

Well status : PERMANENTLY ABANDONED

1 POSITIONING AND ANCHORING OF THE RIG

The location of well 35/11-10 was defined as MN9102. Inline5385, X-line 1871. The spud tolerance was 25m in radius. Well 35/11-10 A is a side track to 35/11-10 and have therefore the same coordinates.

Planned position of the well:

	Geographical coord.	UTM coord.
Lat:	N 61°01'10.65"	N 6765247.1 m
Long:	E 03°31'26.45"	E 528325.0 m

The equipment on board the rig for navigation, was the STARFFIX-MN8 DGPS system.

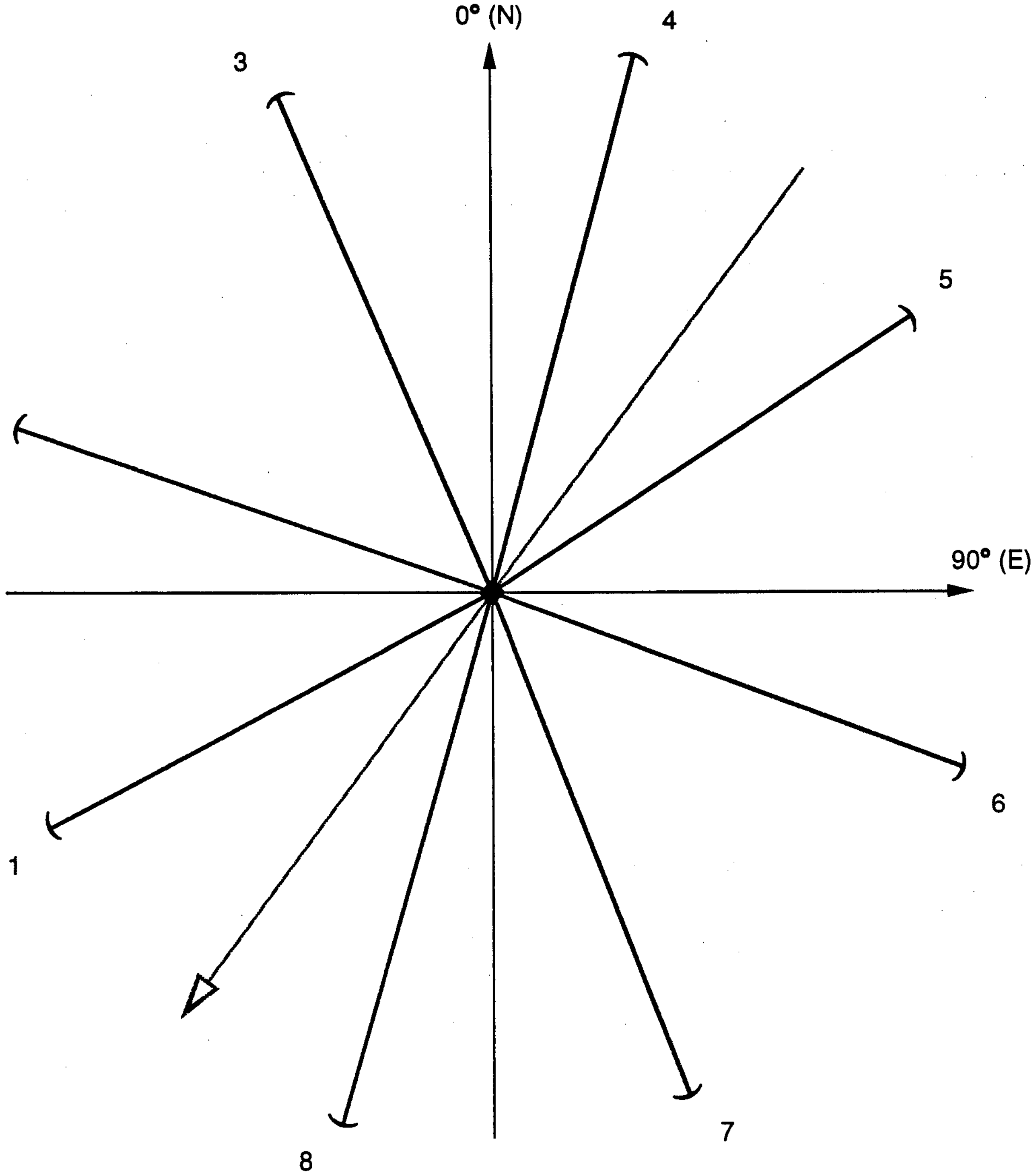
Final location of the well:

	Geographical coord.	UTM coord.
Lat:	N 61°01'10.54"	N 6765243.5 m
Long:	E 03°31'26.29"	E 528323.1 m

Final position was 4.3 m in direction 213.2 deg. (UTM grid) from intended position.

The co-ordinates above refer to the European Datum 1950 (ED50), UTM projection, Zone 31 with Central Meridian 03 degrees East.

The mooring line pattern is shown in figure: B - 1



RIG HEADING 220 DEG.

ANCHOR NO	DIRECTION (DEG.)	LENGTH (m)
1	245	1876
2	287	1907
3	334	1864
4	17	1894
5	60	1859
6	108	1897
7	156	1855
8	198	1884

Figure B - 1		Mooring Line Pattern WEST VANGUARD 35/11-10 A	HYDRO

2 OPERATION RESUME

2.1 Summary of operations

West Vanguard started on well 35/11-10A the 23. of June 1997 at 15:30 hrs. This well is a side track from well 35/11-10. The kick off point was at 1180m and the inclination was max. 40 deg. Drilled to TD of well at 3259m, but had problems to log the well due to tight hole. Left fish in hole from 2763m.

2.1.1 12 1/4" section:

Drilled cement from 1155m to 1180m. Kicked off and drilled and orientated the 12 1/4" hole with a HTC MAX-GTCP09 from 1180m to 2100m.

2.1.2 8 1/2" section:

Drilled and orientated from 2100m to 3259m. The first PDC bit, a Lyng 330 BG got ringed out in an abrassive sand in the Sognefjord Formation. Drilled the rest of the section with a HTC ATMGT-P18DD. This bit was pulled on hours. Drilled to TD with a HTC G445XLA3.

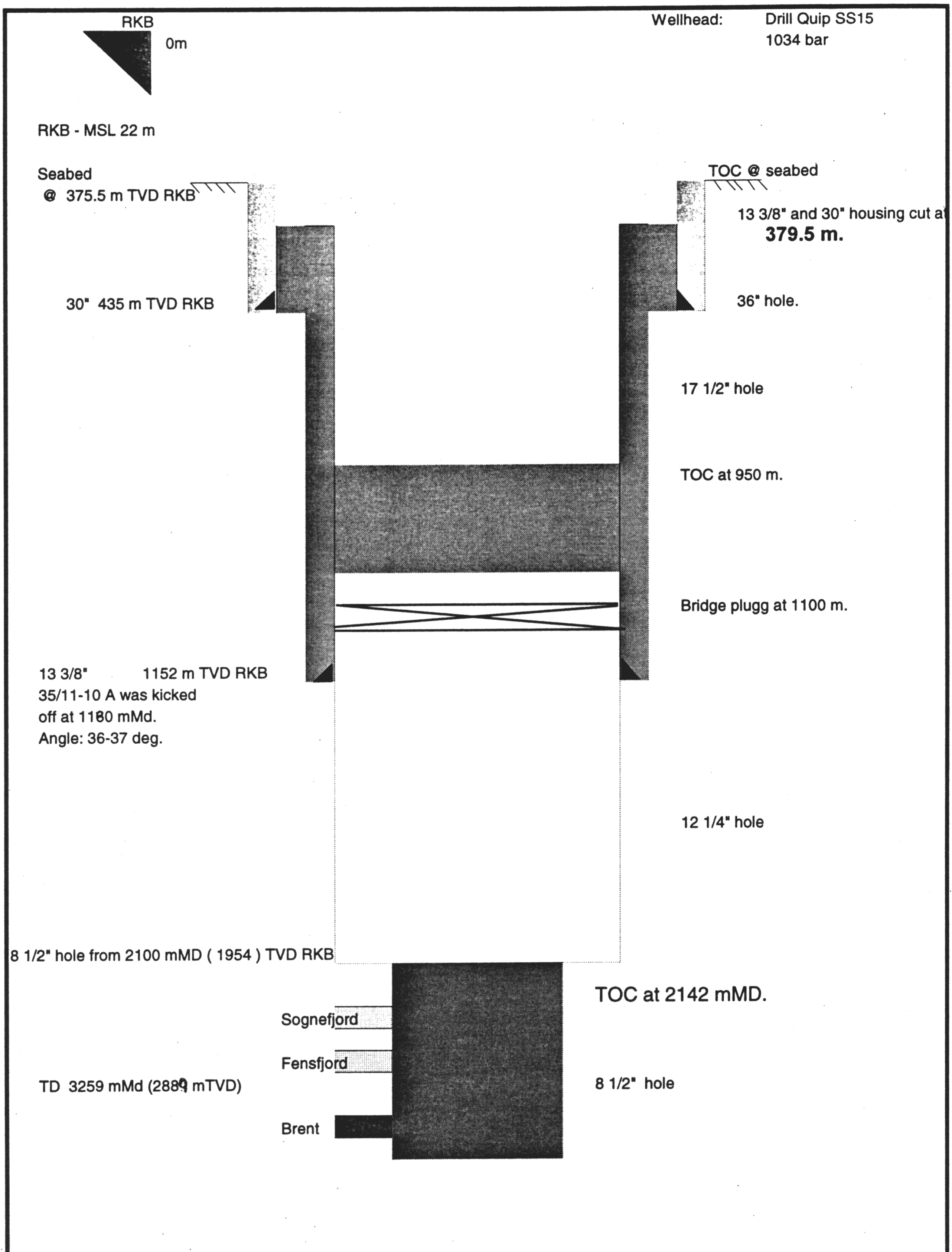
2.1.3 Logging:

Ran wireline into the well in several attempts due to tight hole. Wireline log was not able to pass 2008m. Logged from 2008m to 1052m on the way out. Made up 8 1/2" clean out assembly. Reamed 8 1/2" hole to TD and observed stuck pipe at 3050m. Freed the pipe with 120 ton overpull. Pulled out of the hole. Ran into the hole with the PEX logging string, but was not able to pass 2762m. Logged from 2760m to 2030m and pulled out of the hole .
Ran into the hole with the VSP logging string but was unable to pass 2753m. Prepared to shoot the VSP survey. Observed tool stuck with the top of fishing head at 2667.4m. The wireline was cut and one went in with drill pipe to try to free the VSP string without successes. Recovered 2m of the 70m long VSP logging string. Ran into the hole with 8 1/2" bit to 2641m. Pushed the fish to 2763. Left fish in hole and pulled out. Logged FMI, DSI, NGT on wireline.Pulled out of hole.
Ran drill pipe into the hole with VSP and MDT to 2315m. Logged 8 pressure points with MDT.
Logged seismic survey from 2723m to 1160m. Pulled out of the hole with drillstring to 1100m and reinstalled the side entry sub. Pumped down the locomotive and latched. Logged seismic survey from 1700m to 1380m. Pulled out of the hole.

2.1.4 Plug and abandon:

A balanced cement plug was set in two steps from 2760m to 2000m. The cement plug was tagged and tested with 10 ton weight.

Continued reporting plug and abandonment activity on well 35/11-10



Final 'Well Report 35/11-10 A P & A Program	Revisioı 2 Date:20.11.97	**WELL SCHEMATIC** PLUGGED AND PERMANENT ABANDONED

2.2 Reports

Norsk Hydro

DAILY REPORT ON WELL 35/11-10 A

Daily report no: 1 Date : 23-jun-1997
Midnight depth : 1147 m MD Estimated PP: sg Mudweight: 1.27 sg

Stop time	Description
12:00	No activity on well 35/11-10A.
15:30	Made up the 12 1/4" bottomhole assembly. Loaded and tested the MWD suite.
19:30	Ran in the hole with the 12 1/4" bit to 972 m.
20:30	Slipped and cut the drill line.
21:30	Repaired the draw work.
23:00	Ran in the hole with the 12 1/4" bit from 972 m to 1147 m. No traces of cement.
23:59	Pulled out of the hole from 1147 m to 477 m.

Daily report no: 2 Date : 24-jun-1997
Midnight depth : 1448 m MD Estimated PP: 1.07 sg Mudweight: 1.30 sg

Stop time	Description
02:30	Picked up and ran in the hole with 5" drill pipe while waiting on cement.
03:00	Pulled out of hole from 970 m to 477 m and set back 5" Drill Pipe in the derrick.
05:00	Ran in the hole with the 12 1/4" bit from 477 m to 1155 m. Tagged cement at 1155 m.
06:00	Drilled cement from 1155 m to 1180 m.
23:59	Drilled and orientated 12 1/4" hole to 1448 m.

Daily report no: 3 Date : 25-jun-1997
Midnight depth : 2083 m MD Estimated PP: 1.07 sg Mudweight: 1.31 sg

Stop time	Description
12:30	Drilled and orientated 12 1/4" hole to 1892m.
13:00	Flow checked due to a pit gain. No inflow.
13:30	Drilled to 1898m. Flow checked due to a pit gain. No inflow.
23:59	Drilled and oriented 12 1/4" hole to 2083m.

Daily report no: 4 Date : 26-jun-1997
Midnight depth : 2105 m MD Estimated PP: 1.03 sg Mudweight: 1.30 sg

Stop time	Description
01:30	Drilled 12 1/4" hole to 2100m.
03:30	Circulated 1.5 hole volume. Started to pull out of the hole.
04:30	The tool joint breaker failed . Repaired the tool joint breaker.
05:00	Continued to pull out of the hole. Experienced tight hole from 2100 to 2010m. and swabbed 0.6m3.
05:30	Circulated and worked the pipe out of the hole to 1980m. Continued to pull pipe to 1950m. Still had tight hole and swabbed a total of 0.7m3.
06:00	Ran back into the hole to TD.
07:30	Circulated the hole clean.
08:30	Flow checked the well. Pulled out of the hole to 1845m. Tight hole from 1883m.
09:00	Worked the hole from 1883m to 1845m. Start circulating and freed the drillpipe.

Daily report no: 4 Date : 26-jun-1997
Midnight depth : 2105 m MD Estimated PP: 1.03 sg Mudweight: 1.30 sg

Stop time	Description
09:30	Continued to pull out of the hole.
11:00	Pulled out to the bottom hole assembly at surface.
15:00	Laid down the 12 1/4" bottom hole assembly. Dumped the MWD data.
18:00	Made up the 8.5" bottom hole assembly .
19:30	Ran into the hole to the casing shoe and flowtested the MWD.
21:30	Changed the manual kelly cock on the top drive and installed the tool joint breaker.
23:59	Continued to run into the hole. Started drilling the 8.5" hole.

Daily report no: 5 Date : 27-jun-1997
Midnight depth : 2439 m MD Estimated PP: sg Mudweight: 1.30 sg

Stop time	Description
06:30	Drilled and orientated 8.5" hole to 2292m . Had a drilling break. Flow tested the well. No inflow.
21:30	Drilled to 2439m.
23:59	Pulled out of the hole because of slow penetration rate.

Daily report no: 6 Date : 28-jun-1997
Midnight depth : 2620 m MD Estimated PP: sg Mudweight: 1.30 sg

Stop time	Description
01:00	Performed a flow check at the casing shoe. No inflow. Pulled out of the hole.
02:30	Racked back the bottom hole assembly. Dumped the memory in the MWD.
03:30	Changed the bit and ran the bottom hole assembly into the hole.
06:30	Ran into the hole to 2439m.
23:59	Drilled 8.5" hole from 2439m to 2620m.

Daily report no: 7 Date : 29-jun-1997
Midnight depth : 2875 m MD Estimated PP: 1.03 sg Mudweight: 1.31 sg

Stop time	Description
05:00	Drilled 8.5" hole from 2620m to 2678m. Had a drilling break at 2630m. Performed a flow check. No inflow. .
07:00	Circulated bottoms up. Performed a flow check. No inflow.
10:00	Pulled out of the hole to the casing shoe. performed a flow check. No inflow.
11:00	Pulled out of the hole.
12:00	Changed the bit and ran the bottom hole assembly into the hole.
15:00	Ran back into the hole and resumed drilling.
23:59	Drilled 8.5" hole to 2875m.

Daily report no: 8 Date : 30-jun-1997
Midnight depth : 3259 m MD Estimated PP: 1.03 sg Mudweight: 1.31 sg

Stop time	Description
15:00	Drilled 8.5" hole to 3259m.
18:00	Circulated the hole clean. Performed a flow check. No inflow.
20:30	Pulled out of the hole to 2100m where the 8.5" hole was drilled out of the 12 1/4" hole.
21:00	Washed and reamed the crossover section.
23:30	Pulled out of the hole.
23:59	Laid down the bottom hole assembly.

Daily report no: 9 Date : 01-jul-1997
Midnight depth : 3259 m MD Estimated PP: 1.03 sg Mudweight: 1.33 sg

Stop time	Description
02:00	Laid down the bottom hole assembly and dumped the MWD data.
02:30	Failure in the fingerboard.
04:00	Finished laying down the bottom hole assembly .
05:00	Held pre job safety meeting . Rigged up to run wireline.
11:00	Ran wireline into the well. Not able to pass 1748m. Pulled out of the hole.
11:30	Rigged down wireline.
15:00	Ran into the hole with a 12 1/4" bit to 1709m. Reamed from 1593m to 1622m.
16:30	Reamed from 1709m to 2100m.
22:00	Circulated the hole and conditioned the mud.
23:59	Backreamed out of the hole to 1535m.

Daily report no: 10 Date : 02-jul-1997
Midnight depth : 3259 m MD Estimated PP: 1.03 sg Mudweight: 1.32 sg

Stop time	Description
01:00	Circulated bottoms up from 1535m.
04:30	Pulled out of the hole. Broke out the bit and laid down the bottom hole assembly..
05:30	Prepared to run wireline.
10:00	Ran wireline into the hole. Could not pass 2080m. Pulled out of the hole. Logged from 2080m to 1052m on the way out.
11:00	Rigged down the wireline equipment.
12:30	Made up a 8.5" bottom hole cleanout assembly.
14:00	Ran into the hole to the casing shoe.
15:30	Continued into the hole. Reamed the 12 1/4" to 8 1/2" crossover section from 2089m to 2118m.
21:00	Ran into the 8 1/2" hole to TD. Reamed the tight sections on the way in. Stuck pipe at 3050m. Freed the pipe with 120 tonnes overpull.
23:00	Circulated the hole clean.
23:59	Flow checked the well. No inflow. Pumped a heavy weight slug and started to pull out of the hole.

Norsk Hydro

DAILY REPORT ON WELL 35/11-10 A

Daily report no: 11 Date : 03-jul-1997
Midnight depth : 2675 m MD Estimated PP: 1.03 sg Mudweight: 1.33 sg

Stop time	Description
03:30	Pulled out of the hole to the casing shoe. Flow checked the well. No inflow.
04:30	
05:30	Pulled out of the hole and racked back the bottom hole assembly.
07:00	Held a pre job safety meeting. Rigged up to run wireline.
13:00	Ran into the hole with the PEX logging string. Unable to pass 2762m. Logged from 2760m to 2030m and then pulled out of the hole.
16:00	Rigged down the PEX string and prepared to run the VSP logging string.
23:59	Ran into the hole. The bottom of the string was unable to pass 2753m.

Daily report no: 12 Date : 04-jul-1997
Midnight depth : 3259 m MD Estimated PP: 1.03 sg Mudweight: 1.33 sg

Stop time	Description
01:00	Prepared to shoot the VSP survey. Logging tools stuck with the top of the fishing head at 2667.4m .
05:00	Held a prejob safety meeting. Cut the wireline. Prepared to run into the hole to fish the logging tools with drillpipe.
06:30	Slipped and cut the drilling line.
19:00	Threaded the drillpipe over the wireline and ran into the hole.
21:00	Had problems to pass 2614m. Pulled out one stand. Tried to circulate the well without success. Pulled another stand and managed to establish circulation.
21:30	Circulated the well.
23:59	Continued to run into the hole. Took some weight. Verified circulation at 2585m. Ran into the hole to 2653m.

Daily report no: 13 Date : 05-jul-1997
Midnight depth : 3259 m MD Estimated PP: 1.03 sg Mudweight: 1.31 sg

Stop time	Description
00:30	Circulated at 2653m to clean the overshot.
01:00	Tried to free the VSP string without success.
01:30	Latched the overshot onto the wireline fishing neck. Verified the connection to the fish.
03:30	Pulled three stands to get the VSP string above the position where the string was stuck using the reverse cut and thread method.
04:00	Verified that the fish was still attached. Then pulled the wireline off at the weak point .
06:00	Pulled the wireline out of the hole.
07:30	Pulled out of the hole to 2100m.
08:30	Repaired broken hose on the pipe handler
11:00	Pulled out of the hole with the fish.
12:00	Recovered the upper 2m of the 70m long VSP logging string.
17:30	Made up 8.5" bit and ran into the hole to 2641m.
18:00	Washed down to the top of the fish at 2680m. Pushed the fish to 2763m. Unable to make further progress.

Norsk Hydro

DAILY REPORT ON WELL 35/11-10 A

Daily report no: 13 Date : 05-jul-1997
Midnight depth : 3259 m MD Estimated PP: 1.03 sg Mudweight: 1.31 sg

Stop time	Description
21:00	Circulated and conditioned the mud.
23:59	Ran a wiper trip to 2100m. Tight hole on way out at 2438m and 2331m. Reamed from 2409m to 2438m on the way back into the hole.

Daily report no: 14 Date : 06-jul-1997
Midnight depth : 3259 m MD Estimated PP: 1.03 sg Mudweight: 1.30 sg

Stop time	Description
05:30	Circulated bottoms up . Flow checked the well. No inflow. Pulled out of the hole.
07:30	Prepared to run the FMI/DSI/NGT log on wireline.
19:00	Logged FMI,DSI,NGT.
21:30	Rigged down the FMI string and prepared to run VSP and MDT tools on drillpipe.
23:59	Ran drillpipe into the hole with the logging tools.

Daily report no: 15 Date : 07-jul-1997
Midnight depth : 3259 m MD Estimated PP: 1.03 sg Mudweight: 1.30 sg

Stop time	Description
04:00	Ran into the hole to 1615m and installed the cable sidedoor entry sub. Held a prejob safety meeting prior to running wireline into the hole.
06:00	Ran wireline into the drillpipe. Established contact with the logging tools . Performed a pull test.
09:30	Ran the logging tools into the hole to 2315m.
14:00	While running into the hole took eight pressure points with the MDT tool .
15:00	Trouble shooting seismic navigation software.
16:30	Trouble shooted electrical connections between the downhole logging unit and the rig hydrophones..
23:59	Took seismic survey from 2723m to 2200m.

Daily report no: 16 Date : 08-jul-1997
Midnight depth : 3259 m MD Estimated PP: 1.03 sg Mudweight: 1.30 sg

Stop time	Description
06:30	Continued to log seismic survey from 2200 m to 1660 m.
15:00	Pulled the electrical logging cable and laid down the side entry sub. Pulled out of hole with the drill string to 1100 m and reinstalled the side entry sub. Pumped down the locomotive and latched. Ran in hole to 1710 m.
20:00	Continued to log seismic survey from 1700 m to 1380 m.
23:59	Pulled out of hole with the drill string to 1100 m. Pulled the electrical logging cable, laid down the side entry sub and pulled out of hole.

Daily report no: 17 Date : 09-jul-1997
Midnight depth : 2170 m MD Estimated PP: 1.03 sg Mudweight: 1.32 sg

Stop time	Description
00:30	Laid down the VSP/MDT logging tools and rigged down equipment for electrical logging.
06:30	Cleared the rig floor and made up 3 1/2" drill pipe cement stinger. Ran in hole with the cement stinger to 2754 m.
08:00	Circulated the well prior to setting cement plugs.
09:00	Rigged up cement hose and pressuretested the cement line to 150 bar. With the cement unit, pumped 2,4 m3 freshwater, mixed and pumped 11 m3 1,90 s.g. cement slurry followed with 0,9 m3 fresh water. Displaced the cement with the cement unit.
10:30	Pulled out of cement plug no. 1 from 2760 m to 2435 m.
12:00	Revers circulated out excess cement. Dropped a drill pipe dart and pumped twice the drill pipe volume with mud.
13:00	With the cement unit, pumped 2,4 m3 fresh water, mixed and pumped 12 m3 1,90 s.g. cement slurry followed with 0,9 m3 fresh water. Displaced the cement with the cement unit.
14:00	Pulled out of cement plug no. 2 from 2435 m to 2000 m.
15:00	Revers circulated out excess cement. Dropped a drill pipe dart and pumped twice the drill pipe volume with mud.
16:30	Pulled out of hole to 1275 m.
20:30	Laid out 102 jts. of 5" drill pipe while pulling out of the hole.
21:30	Pulled out of hole with the 3 1/2" drill pipe cement stinger and racked the stinger back in the derrick.
23:59	Made up 8 1/2" bit and ran in hole to tag the cement plug.

Daily report no: 18 Date : 10-jul-1997
Midnight depth : 2142 m MD Estimated PP: 1.03 sg Mudweight: 1.32 sg

Stop time	Description
01:30	Continued to run in the hole from 835 m to 2142 m where hard cement was encountered. Sat down 10 ton weight on the cement.
03:00	Slugged the pipe and pulled out of hole from 2142 m to 1503 m.
04:30	Laid down drill pipe while pulling out of hole.
05:00	Repaired leaking hydraulic hose in the iron roughneck.
07:00	Continued to lay down drill pipe while pulling out of hole.
10:00	Continued to pull out of hole. Laid down heavy weight drill pipe and 8 1/2" bottom hole assembly.
10:30	Cleared the rig floor.
23:59	No activity on well 35/11-10 A. Continued reporting plug and abandonment activity on well 35/11-10

Norsk Hydro

T I M E   D I S T R I B U T I O N

Well: 35/11-10 A   Rig: WEST VANGUARD   Depth: 3259.0 m MD
All sections

Operations	Hours	%	Hours	%	Acc. total
DRILLING					
BHA HANDLING/TESTING	17.5	4.31			
TRIPPING IN CASED HOLE	31.5	7.75			
TRIPPING IN OPEN HOLE	31.0	7.63			
DRILLING	111.5	27.43			
REAMING	4.0	0.98			
CIRC. AND COND. MUD/HOLE	17.5	4.31			
DRILLING OUT CEMENT PLUG	1.0	0.25			
SLIP AND CUT DRILLING LINE	2.5	0.62			
Sum			216.5	53.26	216.5
FORMATION EVALUATION LOGGING					
LOGGING	17.5	4.31			
LOGGING EQUIPMENT HANDLING/TES	25.5	6.27			
FORMATION TESTER	4.5	1.11			
TRIPPING IN CASED HOLE	2.5	0.62			
VERTICAL SEISMIC	19.0	4.67			
TRIPPING IN OPEN HOLE	28.0	6.89			
Sum			97.0	23.86	313.5
PLUG AND ABANDONMENT					
TRIPPING IN CASED HOLE	9.5	2.34			
TRIPPING IN OPEN HOLE	1.5	0.37			
TRIPPING FOR CEMENT JOB	16.5	4.06			
SET CEMENT PLUG	6.0	1.48			
Sum			33.5	8.24	347.0
DOWNTIME DRILLING					
EQUIPMENT FAILURE AND REPAIR	6.0	1.48			
Sum			6.0	1.48	353.0
DOWNTIME FORM. EVAL. LOGGING					
EQUIPMENT FAILURE AND REPAIR	2.5	0.62			
STICKING/GOING STUCK WITH EQUI	5.0	1.23			
FISHING	43.0	10.58			
WIPER TRIP	3.0	0.74			
Sum			53.5	13.16	406.5

Reported time (100.0 % of well total 406.5 hours) : 406.5

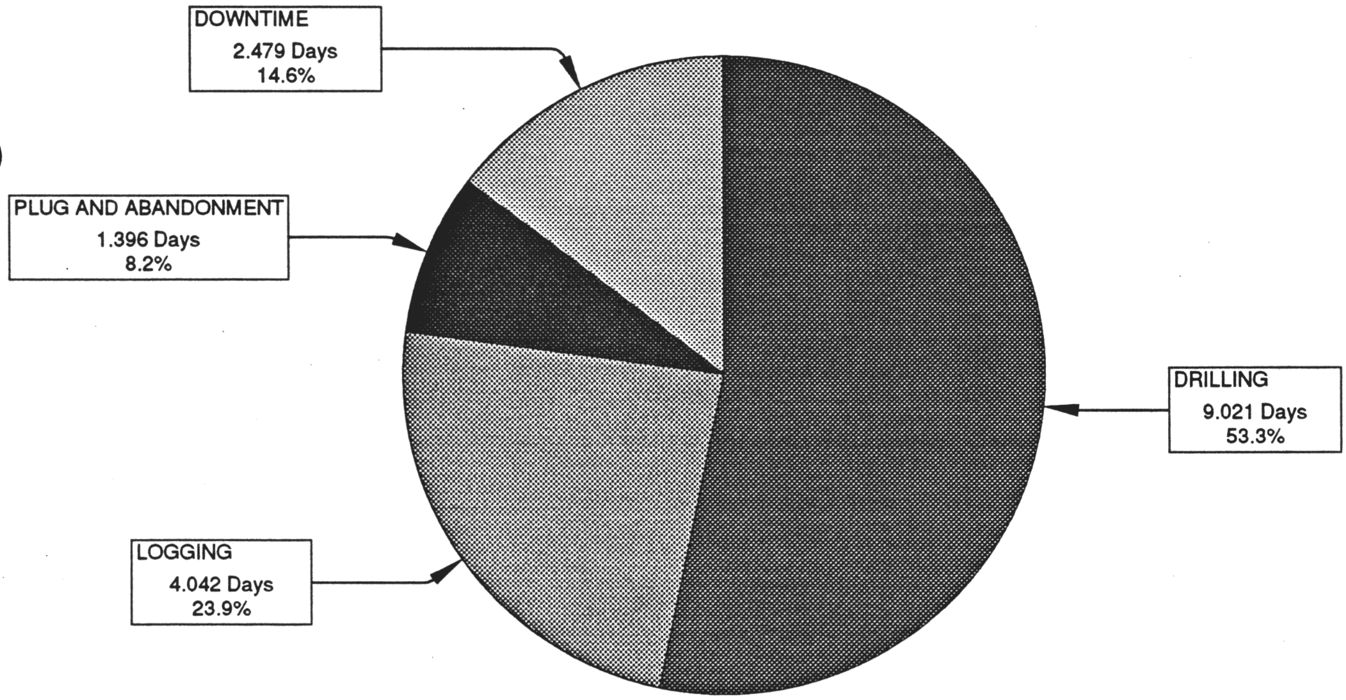


Figure B-3

Time Distribution

Well: 35/11-10 A

HYDRO

Norsk Hydro

H O L E   D E V I A T I O N

Well : 35/11-10 A   Reference Point : RKB , 22.0 m above MSL
Waterdepth: 353.5 m   Vertical to 375.4 m
UTM zone : 31   Central Meredian: 3' E   Horizontal Datum: ED50
Template Centre Coordinates, UTM: North: 0.0 m, East: 0.0 m
Wellhead Coordinates, UTM: North: 6765243.5 m, East: 528323.1 m
Official surveys : Y   Track :
Coordinates are measured from the wellhead centre.

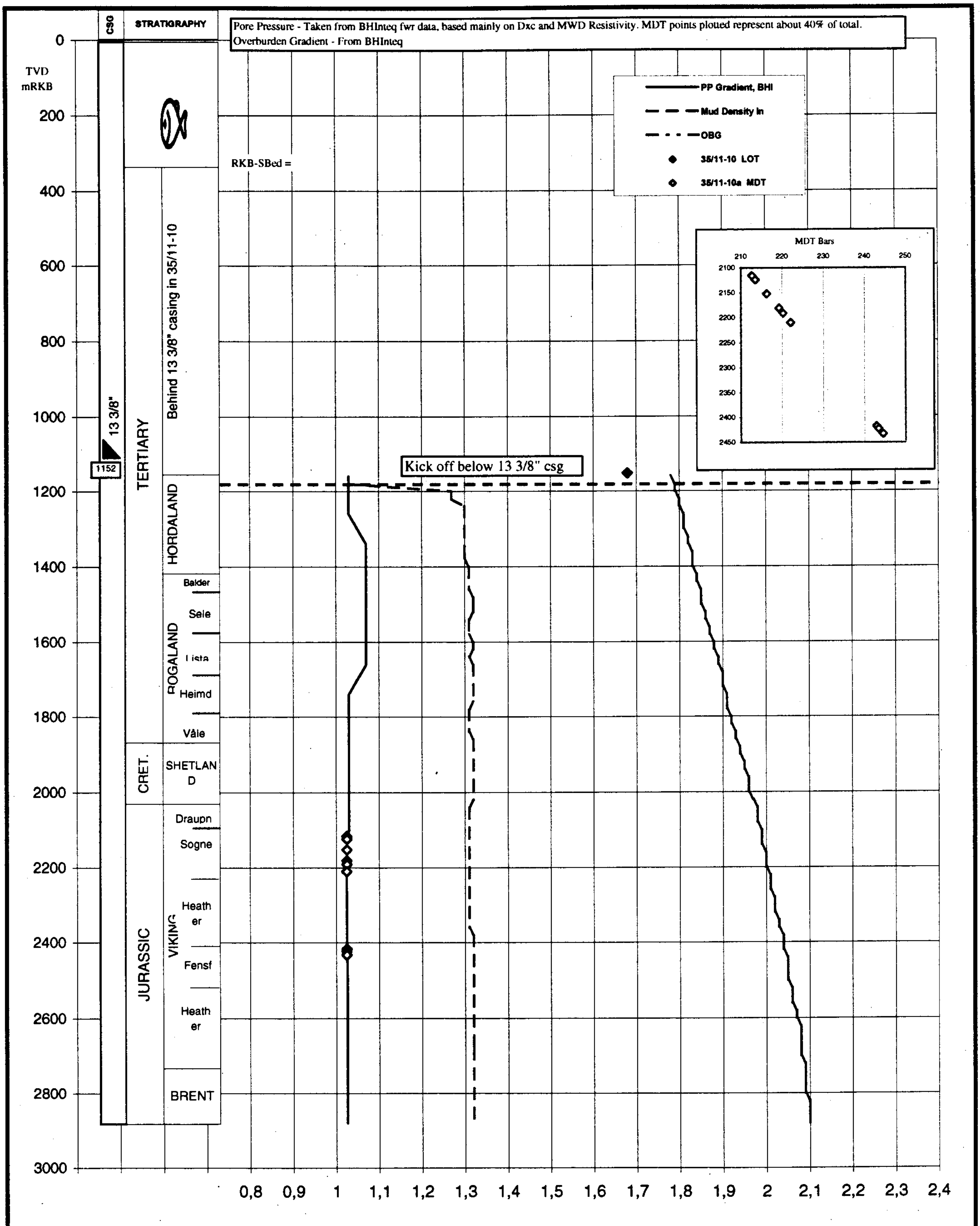
Depth MD [m]	Incli-nation [Deg]	Direc-tion [Deg]	Tool Type	#	Depth TVD [m]	Coordinates North [m]	Coordinates East [m]	Vert. Sect. [m]	Dogleg D/30m	Build D/30m	Turn D/30m
377.0	0.20	188.20	MWD		377.0	-0.00	-0.00	0.0	4.00	4.00	******
386.0	0.40	266.50	MWD		386.0	-0.02	-0.03	0.0	1.36	0.67	261.00
397.0	0.60	271.50	MWD		397.0	-0.02	-0.13	0.1	0.56	0.55	13.64
406.0	0.90	244.10	MWD		406.0	-0.05	-0.24	0.2	1.53	1.00	-91.33
416.0	0.80	219.40	MWD		416.0	-0.14	-0.36	0.4	1.13	-0.30	-74.10
422.0	0.60	195.70	MWD		422.0	-0.20	-0.39	0.4	1.74	-1.00	-118.5
429.0	0.40	264.30	MWD		429.0	-0.24	-0.42	0.5	2.52	-0.86	294.00
457.0	0.70	262.80	MWD		457.0	-0.27	-0.69	0.7	0.32	0.32	-1.61
486.0	0.50	305.90	MWD		486.0	-0.22	-0.97	1.0	0.49	-0.21	44.59
545.0	0.40	293.70	MWD		545.0	0.02	-1.37	1.4	0.07	-0.05	-6.20
661.0	0.60	348.10	MWD		661.0	0.77	-1.86	2.0	0.13	0.05	14.07
748.0	1.10	337.60	MWD		748.0	1.99	-2.28	3.0	0.18	0.17	-3.62
835.0	0.30	120.90	MWD		835.0	2.65	-2.40	3.6	0.47	-0.28	49.41
923.0	0.70	291.70	MWD		923.0	2.73	-2.70	3.8	0.34	0.14	58.23
1010.0	0.70	293.00	MWD		1010.0	3.13	-3.68	4.8	0.01	0.00	0.45
1097.0	0.90	281.60	MWD		1097.0	3.48	-4.84	6.0	0.09	0.07	-3.93
1140.0	0.90	281.80	MWD		1140.0	3.61	-5.50	6.6	0.00	0.00	0.14
1162.0	0.60	272.20	MWD		1162.0	3.65	-5.79	6.8	0.44	-0.41	-13.09
1192.0	0.80	269.80	MWD		1191.9	3.66	-6.15	7.2	0.20	0.20	-2.40
1216.0	1.40	286.90	MWD		1215.9	3.74	-6.60	7.6	0.85	0.75	21.38
1246.0	4.80	275.60	MWD		1245.9	3.97	-8.20	9.1	3.44	3.40	-11.30
1274.0	8.60	279.20	MWD		1273.7	4.42	-11.44	12.3	4.09	4.07	3.86
1302.0	12.70	278.60	MWD		1301.2	5.22	-16.55	17.3	4.39	4.39	-0.64
1331.0	16.90	276.10	MWD		1329.2	6.14	-23.89	24.7	4.39	4.34	-2.59
1361.0	18.90	276.40	MWD		1357.8	7.15	-33.06	33.8	2.00	2.00	0.30
1390.0	20.90	277.70	MWD		1385.1	8.36	-42.85	43.7	2.12	2.07	1.34
1418.0	24.50	277.20	MWD		1410.9	9.76	-53.57	54.4	3.86	3.86	-0.54
1447.0	28.50	273.90	MWD		1436.8	10.98	-66.44	67.3	4.41	4.14	-3.41
1477.0	31.30	270.50	MWD		1462.8	11.54	-81.38	82.2	3.27	2.80	-3.40
1506.0	34.10	272.60	MWD		1487.2	11.97	-97.04	97.8	3.12	2.90	2.17
1535.0	36.40	272.50	MWD		1510.9	12.72	-113.76	114.5	2.38	2.38	-0.10
1564.0	38.00	272.20	MWD		1534.0	13.44	-131.27	132.0	1.67	1.66	-0.31
1593.0	37.80	272.20	MWD		1556.9	14.12	-149.07	149.7	0.21	-0.21	0.00
1622.0	37.70	272.90	MWD		1579.8	14.91	-166.81	167.5	0.46	-0.10	0.72
1653.0	37.40	273.00	MWD		1604.4	15.88	-185.68	186.4	0.30	-0.29	0.10
1682.0	37.30	272.90	MWD		1627.5	16.79	-203.25	203.9	0.12	-0.10	-0.10
1710.0	38.00	273.40	MWD		1649.6	17.73	-220.33	221.0	0.82	0.75	0.54
1740.0	38.50	271.20	MWD		1673.2	18.47	-238.88	239.6	1.45	0.50	-2.20
1798.0	38.50	272.60	MWD		1718.6	19.67	-274.97	275.7	0.45	0.00	0.72
1856.0	38.80	272.40	MWD		1763.9	21.25	-311.16	311.9	0.17	0.16	-0.10
1914.0	39.00	273.60	MWD		1809.0	23.16	-347.53	348.3	0.40	0.10	0.62

Norsk Hydro

H O L E   D E V I A T I O N

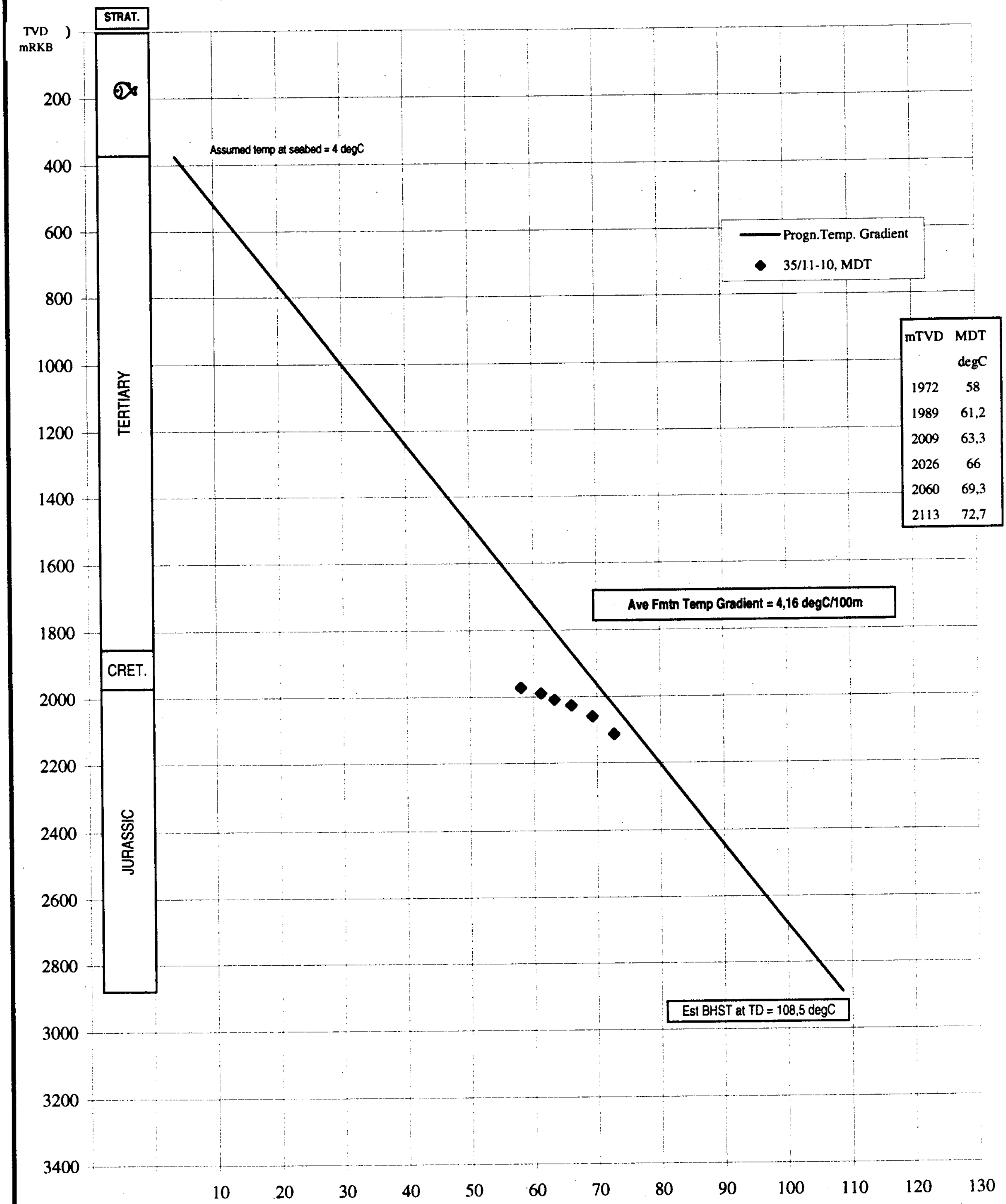
Well : 35/11-10 A Reference Point : RKB , 22.0 m above MSL
Waterdepth: 353.5 m Vertical to 375.4 m
UTM zone : 31 Central Meredian: 3' E Horizontal Datum: ED50
Template Centre Coordinates, UTM: North: 0.0 m, East: 0.0 m
Wellhead Coordinates, UTM: North: 6765243.5 m, East: 528323.1 m
Official surveys : 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
1944.0	38.80	273.40	MWD		1832.4	24.31	-366.33	367.1	0.24	-0.20	-0.20
1973.0	38.80	270.80	MWD		1855.0	24.97	-384.49	385.3	1.69	0.00	-2.69
2031.0	38.90	271.50	MWD		1900.1	25.70	-420.86	421.6	0.23	0.05	0.36
2080.0	38.40	272.10	MWD		1938.4	26.66	-451.45	452.2	0.38	-0.31	0.37
2095.0	38.90	273.60	MWD		1950.1	27.13	-460.80	461.6	2.12	1.00	3.00
2122.0	39.10	272.70	MWD		1971.1	28.06	-477.77	478.6	0.67	0.22	-1.00
2153.0	39.20	271.20	MWD		1995.1	28.73	-497.33	498.2	0.92	0.10	-1.45
2182.0	39.90	272.30	MWD		2017.5	29.29	-515.79	516.6	1.02	0.72	1.14
2240.0	36.10	272.70	MWD		2063.2	30.84	-551.45	552.3	1.97	-1.97	0.21
2269.0	36.20	272.10	MWD		2086.6	31.56	-568.55	569.4	0.38	0.10	-0.62
2298.0	36.10	271.50	MWD		2110.0	32.10	-585.64	586.5	0.38	-0.10	-0.62
2326.0	36.70	270.20	MWD		2132.6	32.34	-602.26	603.1	1.05	0.64	-1.39
2385.0	36.30	268.30	MWD		2180.0	31.89	-637.35	638.1	0.61	-0.20	-0.97
2414.0	36.50	268.80	MWD		2203.3	31.45	-654.55	655.3	0.37	0.21	0.52
2472.0	34.80	269.00	MWD		2250.5	30.80	-688.35	689.0	0.88	-0.88	0.10
2501.0	36.00	268.30	MWD		2274.1	30.40	-705.14	705.8	1.31	1.24	-0.72
2530.0	37.20	267.20	MWD		2297.4	29.72	-722.42	723.0	1.41	1.24	-1.14
2560.0	35.80	267.30	MWD		2321.5	28.87	-740.24	740.8	1.40	-1.40	0.10
2589.0	37.00	269.40	MWD		2344.9	28.38	-757.44	758.0	1.79	1.24	2.17
2618.0	40.10	269.70	MWD		2367.5	28.24	-775.51	776.0	3.21	3.21	0.31
2647.0	40.10	269.50	MWD		2389.7	28.10	-794.19	794.7	0.13	0.00	-0.21
2676.0	39.70	269.90	MWD		2412.0	28.01	-812.79	813.3	0.49	-0.41	0.41
2705.0	40.00	269.90	MWD		2434.2	27.97	-831.37	831.8	0.31	0.31	0.00
2734.0	40.10	270.30	MWD		2456.4	28.01	-850.03	850.5	0.29	0.10	0.41
2763.0	40.40	270.40	MWD		2478.6	28.12	-868.77	869.2	0.32	0.31	0.10
2793.0	40.00	270.40	MWD		2501.5	28.26	-888.13	888.6	0.40	-0.40	0.00
2822.0	40.00	270.30	MWD		2523.7	28.37	-906.77	907.2	0.07	0.00	-0.10
2849.0	39.20	270.30	MWD		2544.5	28.46	-923.98	924.4	0.89	-0.89	0.00
2879.0	38.20	270.50	MWD		2567.9	28.59	-942.74	943.2	1.01	-1.00	0.20
2909.0	37.00	270.10	MWD		2591.7	28.69	-961.04	961.5	1.22	-1.20	-0.40
2967.0	36.10	269.80	MWD		2638.3	28.66	-995.58	996.0	0.47	-0.47	-0.16
3055.0	33.30	269.90	MWD		2710.6	28.53	-1045.7	1046.1	0.95	-0.95	0.03
3142.0	28.00	269.80	MWD		2785.4	28.41	-1090.0	1090.4	1.83	-1.83	-0.03
3229.0	27.70	269.80	MWD		2862.3	28.27	-1130.7	1131.0	0.10	-0.10	0.00
3259.0	27.70	269.30	MWD		2888.9	28.16	-1144.6	1144.9	0.23	0.00	-0.50



Final Well Report 35/11-10a	Figure: 5.1	Final pore pressure, mud density, fracture- and overburden gradients

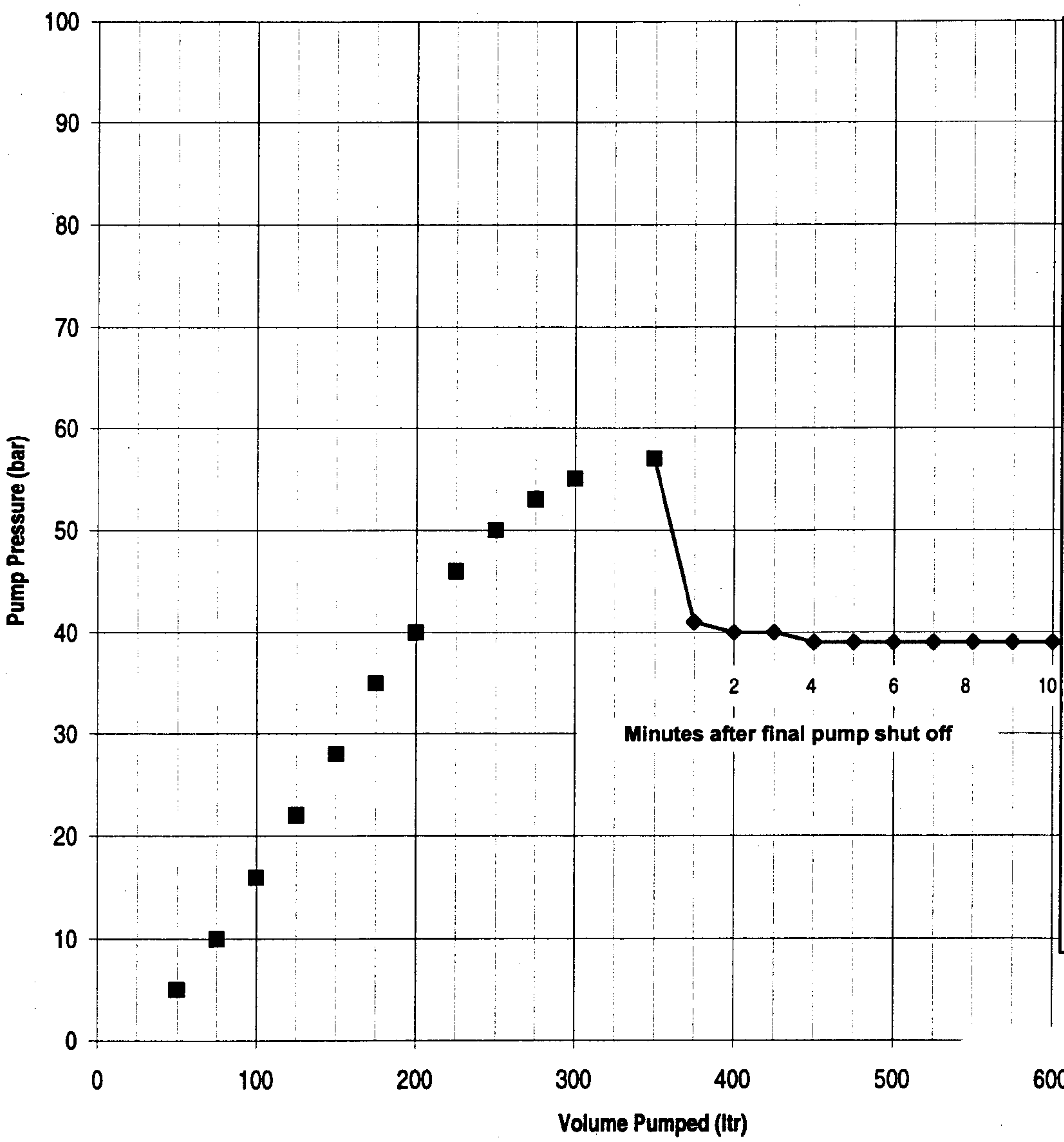
efd/1997-12-16/13:13:.....\351110ap_fwr.xls



mTVD	MDT degC
1972	58
1989	61,2
2009	63,3
2026	66
2060	69,3
2113	72,7

Final Well Report 35/11-10a		Final Formation Temperature Gradient	HYDRO

Well 35/11-10 a		Test type - ELOT/LOT/FIT LOT		Test date 29.05.97	
Rig West Vanguard	Airgap(m) 22	Water depth (m) 353,5	Csg OD (in 13 3/8"	Hole angle (deg) 0,9	
Csg Shoe (mMD/mTVD) 1152	1152	OH depth, (mMD/mTVD) 1161	1161	Lithology Siltstone	
Mud Properties	Dens (sg) 1.25	API WL(ml/30min) 2.6/0.5	PV (cp) 23	YP (Pa) 9	Gels (Pa 3/6
Pump Rate (l/min) 50		Vol pumped (l.) 350		Vol bled back (l.) 320	
Leakoff Pressure (bar) 49		Max pressure (bar) 57		Propagation press. (bar) 39	
Test result (sg EMD) **1.68**		Comments Test from 35/11-10			



Vol. ltrs	Pump bar	Time mins.
50	5	
75	10	
100	16	
125	22	
150	28	
175	35	
200	40	
225	46	
250	50	
275	52	
300	55	
350	57	
	41	1
	40	2
	40	3
	39	4
	39	5
	39	6
	39	7
	39	8
	39	9
	39	10

Final Well Report 35/11-10 a		**Formation Strength Test Report**

HYDRO

4 MATERIAL REPORT

4.1 Tab. B -4 Main consumption of casing
4.2 Tab. B - 5 Main consumption of cement additives
4.3 Tab. B - 6 Cement and additive consumption per job on well 35/11-10 a
4.4 Tab. B - 7 Bit Record
4.5 Tab. B - 8 Bottom hole assemblies
4.6 Tab. B - 9 Total consumption of mud additives
4.7 Tab. B - 10 Daily mud rheology
4.8 Tab. B - 11 Daily mud properties.

Norsk Hydro

21-nov-1997

UNOFFICIAL DATA

MAIN CONSUMPTION OF CASING/TUBING ON WELL

Size	Casing string	Grade	Weight [kg/m]	Weight [lb/ft]	Threads type	Length [m]	No. of joints	Cost of str. in hole	Total cost of string

Norsk Hydro

TOTAL CONSUMPTION OF CEMENT ADDITIVES
ON WELL 35/11-10 A

Section	Cement/ Additive	Unit	Total Amount Used	Cost [kNOK]
8 1/2"	API CLASS G	MT	38.0	
	CFR-3L	l	731.0	
	GASCON	l	1729.0	
	HAL600	l	1457.0	
	NF-5	l	5.0	
	SCR100	kg	650.0	

Norsk Hydro

CEMENT/ADDITIVE CONSUMPTION PER JOB ON WELL 35/11-10 A

Date	CsgSize	Jobtype	Cement/ Additive	Description	Unit	Amount Planned Used	Amount Actual Used	Difference Amount	Difference %	Difference Cost [kNOK]
09-jul-1997	UNDEFIN	PLUG IN OPEN HOL	API CLASS G	API CLASS G	MT		19			
			CFR-3L	DISPERSANT: CFR-3 LIQUID	l		366			
			GASCON	EDP-C469-91	l		865			
			HAL600	FLUID LOSS ADDITIVE: HALAD-600	l		724			
			NF-5	NF-5	l		3			
			SCR100	RETARDER: SCR-100	kg		325			
09-jul-1997	UNDEFIN	PLUG IN OPEN HOL	API CLASS G	API CLASS G	MT		19			
			CFR-3L	DISPERSANT: CFR-3 LIQUID	l		365			
			GASCON	EDP-C469-91	l		864			
			HAL600	FLUID LOSS ADDITIVE: HALAD-600	l		733			
			NF-5	NF-5	l		2			
			SCR100	RETARDER: SCR-100	kg		325			

B I T R E C O R D F O R W E L L 35/11-10 A

Bit No	Bit RR	Bit Type	Size (in)	Manufacturer	Tradename	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)	Bit grading: Cutting structur I	Bit grading: Cutting structur O	Bit grading: DC	Bit grading: L	Bit grading: B	Bit grading: Gauge 1/16 (in)	Bit grading: Remarks oth	Bit grading: Remarks pul
1		ISRT	12.250	HTC	MAX-GTCP09	J39CF	435			18	20	20	22	1.233	1	2100	1000	33.20	30.1	112/289	415	10/430	3500/3800	110/234	3	8	BT	S	1	1	CT	BHA
2		PDC	8.500	LYNG	LA 330 BG	2014	M648		13	13	13	13	13	0.648	2	2439	339	16.90	20.1	219/411	362800	10/150	1600/2500	189/293	8	4	RO	N	X	1	ER	PR
3		ISRT	8.500	HTC	ATMGTP18DD	K76CV	447				16	16	16	0.589	3	2678	239	18.90	12.6	179/295	287	50/270	2050/2650	179/259	4	8	BT	A	E	2	ER	HR
4		PDC	8.500	HTC	G445XLA3	1210062	M332			14	14	14	14	0.601	4	3259	581	18.40	31.6	161/364	352500	10/140	1300/2600	106/342	2	2	WT	S	X	3	ER	TD

Norsk Hydro

BOTTOM HOLE ASSEMBLIES USED ON WELL 35/11-10 A

BHA no. 1: No./Element/OD(in)/Length(m) Depth In: 1100 m MD Out: 2100 m MD

1	MAX-GTCP09	12.250	0.40	9	DRILL COLLAR STEEL	8.000	36.95
2	DOWN HOLE MOTOR WITH	12.250	10.96	10	JAR	8.000	9.70
3	STEEL STAB	12.125	1.80	11	DRILL COLLAR STEEL	8.000	18.35
4	X-OVER	8.250	0.49	12	X-OVER	8.000	1.59
5	MWD	8.250	12.34	13	HWDP	5.000	82.14
6	SAVER SUB	8.250	0.90	14	DRILL PIPE	5.000	289.88
7	NON MAG. STAB	12.000	2.11	15	X-OVER	7.250	0.81
8	NON MAG. COLLAR	8.000	8.93				

Reason Pulled: CHANGE BOTTOMHOLE ASSEMBLY Sum: 477.35

BHA no. 2: No./Element/OD(in)/Length(m) Depth In: 2100 m MD Out: 2439 m MD

1	LA 330 BG	8.500	0.29	7	NON MAG. STAB	8.250	2.14
2	DOWNHOLE MOTOR	6.750	9.61	8	NON MAG. COLLAR	6.500	9.00
3	NEAR BIT STAB	8.375	1.86	9	HWDP	6.625	54.72
4	PIN-PIN SUB	6.750	0.77	10	JAR	6.600	9.79
5	MWD	6.750	4.44	11	HWDP		27.42
6	MWD	6.750	10.87	12	DRILL PIPE		1275.63

Reason Pulled: PENETRATION RATE Sum:1406.54

BHA no. 3: Depth In: 2439 m MD Out: 2678 m MD; same elements as in BHA no. 2
Except Bit, here HTC, ATMGTP18DD (Length 0.29 m)
Reason Pulled: HOURS

BHA no. 4: Depth In: 2678 m MD Out: 3259 m MD; same elements as in BHA no. 2
Except Bit, here HTC, G445XLA3 (Length 0.32 m)
Reason Pulled: TOTAL DEPTH/CASING DEPTH

TOTAL CONSUMPTION OF CEMENT ADDITIVES ON WELL 35/11-10 A

Section	Cement/ Additive	Unit	Total Amount Used	Cost [kNOK]
8 1/2"	API CLASS G	MT	38.0	
	CFR-3L	l	731.0	
	GASCON	l	1729.0	
	HAL600	l	1457.0	
	NF-5	l	5.0	
	SCR100	kg	650.0	

DAILY MUD PROPERTIES : RHEOLOGY PARAMETERS FOR WELL 35/11-10 A

Hole section: 12 1/4" WATER BASED SYSTEM

Date	Depth [m] MD	Depth [m] TVD	Mud Type	Funnel Visc [sec]	Dens [sg]	Mudtmp Out [DegC]	Fann 600	Fann 300	Fann 200	Fann 100	Fann 60	Fann 30	Fann 6	Fann 3	Rheo Test [DegC]	PV [mPas]	YP [Pa]	Gel0 [Pa]	Gel10 [Pa]
23-jun-1997 21:30	1090		ANCO 2000	72.0	1.27	0.0	64	47	37	27			11	10	50.0	17.0	15.0	5.0	9.0
24-jun-1997 22:30	1400	1394	ANCO 2000	79.0	1.30	0.0	82	59	49	36			12	3	50.0	23.0	18.0	5.0	11.0
25-jun-1997 23:30	2084	1942	ANCO 2000	73.0	1.31	0.0	79	55	45	34			12	10	50.0	24.0	15.5	5.0	10.0

Hole section: 8 1/2" WATER BASED SYSTEM

Date	Depth [m] MD	Depth [m] TVD	Mud Type	Funnel Visc [sec]	Dens [sg]	Mudtmp Out [DegC]	Fann 600	Fann 300	Fann 200	Fann 100	Fann 60	Fann 30	Fann 6	Fann 3	Rheo Test [DegC]	PV [mPas]	YP [Pa]	Gel0 [Pa]	Gel10 [Pa]
26-jun-1997 22:00	2100	1954	ANCO 2000	77.0	1.30	0.0	80	56	45	32			12	10	50.0	24.0	16.0	5.0	11.0
27-jun-1997 22:00	2439	2224	ANCO 2000	80.0	1.30	0.0	85	58	46	32			13	10	50.0	27.0	16.0	5.0	13.0
28-jun-1997 21:30	2620	2369	ANCO 2000	81.0	1.30	0.0	78	54	42	29			11	8	50.0	24.0	15.0	4.0	12.5
29-jun-1997 22:15	2870	2561	ANCO 2000	78.0	1.31	0.0	86	59	51	34			12	9	50.0	27.0	16.0	5.0	13.0
30-jun-1997 21:00	3259	2889	ANCO 2000	84.0	1.31	0.0	87	60	50	34			13	9	50.0	27.0	17.0	5.0	14.5
01-jul-1997 23:00	3259	2889	ANCO 2000	72.0	1.33	0.0	75	50	39	28			10	8	50.0	25.0	13.0	4.0	10.0
02-jul-1997 21:00	3259	2889	ANCO 2000	83.0	1.32	0.0	78	53	42	30			10	8	50.0	25.0	14.0	4.0	9.0
03-jul-1997 18:30	3259	2889	ANCO 2000	78.0	1.33	0.0	82	55	44	31			10	8	50.0	27.0	14.0	4.5	9.5
04-jul-1997 20:30	3259	2889	ANCO 2000	80.0	1.33	0.0	81	55	44	31			10	8	50.0	26.0	15.0	4.5	9.0
05-jul-1997 21:00	3259	2889	ANCO 2000	76.0	1.31	0.0	79	53	42	30			10	8	50.0	26.0	14.0	4.5	9.0
06-jul-1997 20:15	3259	2889	ANCO 2000	84.0	1.30	0.0	80	54	43	31			10	8	50.0	26.0	14.0	4.5	9.5
07-jul-1997 10:00	3259	2889	ANCO 2000	85.0	1.30	0.0	79	54	43	31			10	8	50.0	25.0	15.0	4.5	9.0
08-jul-1997 18:00	3259	2889	ANCO 2000	85.0	1.30	0.0	79	54	43	31			10	8	50.0	25.0	15.0	4.5	9.0
09-jul-1997 07:15	2763	2479	ANCO 2000	82.0	1.32	0.0	83	56	45	32			10	8	50.0	27.0	15.0	5.0	10.0

See also the report 'DAILY MUD PROPERTIES : OTHER PARAMETERS'

Norsk Hydro

DAILY MUD PROPERTIES : OTHER PARAMETERS FOR WELL 35/11-10 A

Hole section: 12 1/4"

WATER BASED SYSTEM

Date	Depth MD [m]	Depth TVD [m]	Mud Type	Dens [sg]	Filtrate API [ml]	Filtrate HPHT [ml]	Filt.cake API [mm]	Filt.cake HPHT [mm]	HPHT Press/Temp [psi/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]	Percentage Solid [%]	Percentage Oil [%]	Percentage Sand [%]	CEC [Kg/m3]	ASG [sg]	LGS [Kg/m3]
23-jun-1997 21:30	1090		ANCO 2000	1.27	2.9	0.0	0	0	0/0	9.0	0.0	0.0	0.6	140	73400	70500	760	0	800	14.0	0.0	0.2	14	0.0	129
24-jun-1997 22:30	1400	1394	ANCO 2000	1.30	2.2	0.0	0	0	0/0	8.0	0.0	0.1	0.7	140	73400	72000	560	0	680	14.5	0.0	0.2	14	0.0	104
25-jun-1997 23:30	2084	1942	ANCO 2000	1.31	2.2	0.0	0	0	0/0	8.0	0.0	0.1	0.5	145	76000	74500	620	0	700	14.0	0.0	0.3	30	0.0	38

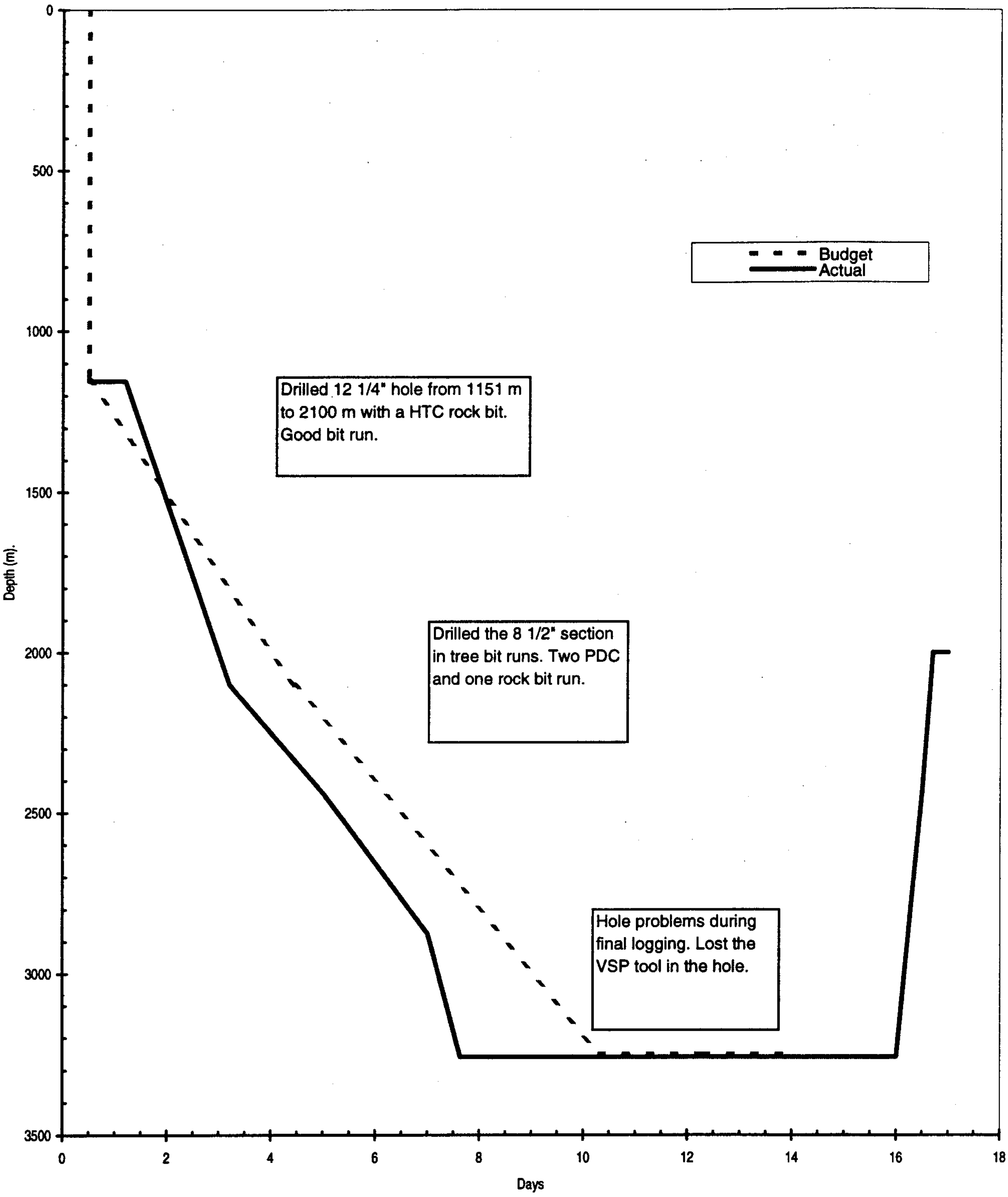
Hole section: 8 1/2"

WATER BASED SYSTEM

Date	Depth MD [m]	Depth TVD [m]	Mud Type	Dens [sg]	Filtrate API [ml]	Filtrate HPHT [ml]	Filt.cake API [mm]	Filt.cake HPHT [mm]	HPHT Press/Temp [psi/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]	Percentage Solid [%]	Percentage Oil [%]	Percentage Sand [%]	CEC [Kg/m3]	ASG [sg]	LGS [Kg/m3]
26-jun-1997 22:00	2100	1954	ANCO 2000	1.30	2.4	0.0	0	0	0/0	8.1	0.0	0.1	0.5	141	73900	74500	720	0	700	14.5	0.0	0.2	30	0.0	98
27-jun-1997 22:00	2439	2224	ANCO 2000	1.30	1.8	0.0	0	0	0/0	8.1	0.0	0.1	0.4	146	76600	74500	520	0	640	14.5	0.0	0.1	30	0.0	97
28-jun-1997 21:30	2620	2369	ANCO 2000	1.30	1.7	0.0	0	0	0/0	8.3	0.0	0.0	0.5	141	73900	76000	520	0	600	15.0	0.0	0.1	30	0.0	120
29-jun-1997 22:15	2870	2561	ANCO 2000	1.31	1.7	0.0	0	0	0/0	8.0	0.0	0.0	0.5	144	75500	77000	560	0	640	14.5	0.0	0.2	30	0.0	75
30-jun-1997 21:00	3259	2889	ANCO 2000	1.31	2.2	0.0	0	0	0/0	8.0	0.0	0.0	0.5	141	73900	81000	440	0	560	15.0	0.0	0.3	30	0.0	92
01-jul-1997 23:00	3259	2889	ANCO 2000	1.33	2.2	0.0	0	0	0/0	8.0	0.0	0.0	0.5	146	76600	81500	460	0	580	16.0	0.0	0.3	29	0.0	234
02-jul-1997 21:00	3259	2889	ANCO 2000	1.32	2.0	0.0	0	0	0/0	8.1	0.0	0.0	0.5	142	74500	82000	460	0	560	16.0	0.0	0.3	28	0.0	127
03-jul-1997 18:30	3259	2889	ANCO 2000	1.33	1.9	0.0	0	0	0/0	8.1	0.0	0.0	0.5	142	74500	81000	420	0	560	16.0	0.0	0.3	28	0.0	114
04-jul-1997 20:30	3259	2889	ANCO 2000	1.33	2.0	0.0	0	0	0/0	8.1	0.0	0.0	0.5	142	74500	81000	440	0	560	16.0	0.0	0.3	28	0.0	114
05-jul-1997 21:00	3259	2889	ANCO 2000	1.31	1.7	10.4	0	2	33/110	8.1	0.0	0.0	0.5	140	73400	80000	440	0	560	15.0	0.0	0.3	28	0.0	110
06-jul-1997 20:15	3259	2889	ANCO 2000	1.30	1.7	10.4	0	2	33/110	8.1	0.0	0.0	0.5	138	72400	79500	420	0	540	15.0	0.0	0.3	25	0.0	110
07-jul-1997 10:00	3259	2889	ANCO 2000	1.30	1.7	10.2	0	2	33/110	8.1	0.0	0.0	0.5	142	72500	79500	420	0	560	15.0	0.0	0.3	25	0.0	111
08-jul-1997 18:00	3259	2889	ANCO 2000	1.30	1.7	10.2	0	2	33/110	8.1	0.0	0.0	0.5	142	74500	79500	420	0	560	15.0	0.0	0.3	25	0.0	111
09-jul-1997 07:15	2763	2479	ANCO 2000	1.32	1.6	10.2	0	2	33/110	8.3	0.0	0.0	0.6	140	73400	80000	420	0	560	15.3	0.0	0.3	27	0.0	94

See also the report 'DAILY MUD PROPERTIES : RHEOLOGY PARAMETERS'

5 DRILLING PROGRESS CURVE



Well 35/11-10A	Drilling Curve	

FORMATION PRESSURE WORKSHEET

Well Name : 35/11-10 A Rig : West Vanguard Date : 06.-07.07.97

Pressure Units : Bars RKB-MSL : 22 m. MSL-SBed: 353.5 m. Witnessed by : Nyby/Bremmeng

Run No./ Test No. 1A	Depth mMD RKB	Depth mTVD RKB	Initial Hydrostatic Pressure Qtz	Initial Hydrostatic Pressure Strain	Formation Pressure Qtz	Formation Pressure Strain	Final Hydrostatic Pressure Qtz	Final Hydrostatic Pressure Strain	Time hh:mm Set	Time hh:mm Retract	Formation Pressure sg EMD	Test Temp degC	Good Data? Y/N	Sample Information Main Fluid Type	HC Gravity g/cc	Sample Vol, cc	Remarks Mobility (mD/Cp)
1A/1	2305.0	2115.7	274 247	274.47	212 694	213.05	274 026	274.39	09:40	09:45	1 025	71.6	Y				854.4
1A/2	2314.9	2123.7	275 407	275.70	213 519	213.92	275 389	275.67	10:00	10:05	1 026	74.2	Y				365.5
1A/3	2350.0	2151.8	278 712	279.02	216 279	216.68	278 756	279.10	10:20	10:25	1 025	76.2	Y				460.9
1A/4	2386.0	2180.8	282 405	282.82	219 204	219.64	282 495	282.67	10:58	11:00	1 025	78.2	Y				472.5
1A/5	2398.5	2190.9	284 179	284.50	220 200	220.65	284 231	284.61	11:20	11:28	1 025	79.4	Y				34.6
1A/6	2421.5	2209.5	286 383	286.74	222 024	222.47	286 466	286.82	11:43	11:50	1 024	80.1	Y				28.2
1A/7	2682.6	2417.0	313 226	313.59	242 947	243.40	313 196	313.71	12:50	12:54	1 025	86.0	Y				2779.0
1A/8	2690.0	2422.7	314 193	314.58	243 484	243.94	314 404	314.78	13:15	13:16	1 025	87.7	Y				675.0
1A/9	2702.5	2432.3	315 789	316.21			315 886	316.11	13:25	13:28		88.4	N				Low permeable
1A/10	2703.0	2432.7	315 919	316.33	244 490	244.95	315 980	316.36	13:35	13:40	1 025	88.7	Y				114.8

NB: Fmtn Press sg calculated from RKB Page : 1 of : 1

1AMDT.WK4